Subhead-2.1

Substation & Related Works

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.1	**HT (11 KV) SWITCHGEAR** Supply of 11 KV, 3-phase, 50 Hz, indoor type, high tension switchgear complete with Load Break Switch (LBS), 800 A hard-drawn electrolytic copper bus-bars, 1 No. 0-15 KV range digital voltmeter & 1 no. digital ammeter of adequate ranges both with selector switch, 1 no. of panel heater with auto thermostat control switch, manual ON & OFF push button switch and indicators including following components such as LBS, HR.C fuse, CT, PT shall be manufactured & tested as per NEMA / VDE / IEC / JIS / BS Standards along with relevant BDS standard assembled locally in 14 SWG sheet steel clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted / approved by the Engineer-in-charge. Panel board is provided with capacitive information level and all types of danger sign. All doors of panel board are connected by ECC with earthing bus bar. In case of 630 KVA or above capacity sub-station, the switchgear panel shall have to be furnished with audible alarm & auxiliary relays for sensing signals from buchholz relay and operation of HT switchgear. CT Ratio (to be chosen as per capacity):- For 100-150 KVA transformer 10/5 For 200-250 KVA transformer 15/5 For 300-315 KVA transformer 20/5 For 400 KVA transformer 25/5 For 500 KVA transformer 30/5					
2.1.1.1	**With LBS (Load Break Switch)** 1 Set of 11 KV, 630 A (36KA), 50 Hz, triple pole, manually operated off load isolator interlocked with earth switch.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	1 Set of 11 KV, 630A (36KA), 50 Hz, spring charged, stored energy mechanism triple pole load break switch (LBS) complete with 3 no's of 11 KV HR.C fuse of suitable Amps. (25KA) with spring operated striker pin plunger for automatic tripping activated by any of the thr.ee fuses blow-up. 2 Nos. of 11 KV, double pole, cast resin insulated, dry type Potential transformer (P.T.) having ratio 11/0.11, 50VA, class 0.5 for metering. 3 Nos. of 11 KV, cast resin insulated, dry type, single core Current transformer (C.T.) having adequate current ratio (compatible with the transformer capacity) burden 10-15VA of class 0.5 M5 for metering. 1 No of 415V, 6A (10 KA), 50 Hz. TPMCB for PT secondary protection. **Assembled by the valid ISO-9001 certified company having test certificate (within at least 5 years) according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.**	Each	**403,085.00**	**403,085.00**	**403,085.00**	**403,085.00**

2.1.1.2 **With withdrawable type VCB (vacuum circuit breaker)**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply of 11 KV, 3-phase, 50 Hz, indoor type, high tension switchgear complete with Vacuum Circuit Breaker, 800 A hard-drawn electrolytic copper bus-bars, 1 No 0-15 KV range voltmeter & 1 no. ammeter of adequate range both with selector switch, 1 no. of panel heater with auto thermostat control switch, manual ON & OFF push button switch and ON-OFF-TRIP indicators including following components such as VCB, CT, PT, microprocessor controlled IDMT relay shall be manufactured as per NEMA / VDE / IEC / JIS / BS standards along with BDS IEC 60076, PART 1: 2016 shall have test certificate (within 5 years) according to relevant IEC standard assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted / approved by the Engineer-in-charge. Panel board is provided with capacitive information level and all types of danger sign. All doors of panel board are connected by ECC with earthing bus bar. In case of 630 KVA or above capacity sub-station, the switchgear panel shall have to be furnished with audible alarm & auxiliary relays for sensing signals from buchholz relay and operation of HT switchgear. CT Ratio (to be chosen as per capacity) : - For 500 KVA transformer 30/5/5 For 630 KVA transformer 40/5/5 For 800 KVA transformer 50/5/5 For 1000 KVA transformer 60/5/5 For 1250 KVA transformer 70/5/5 For 1500 KVA transformer 80/5/5 For 2000 KVA transformer 110/5/5					
	With withdrawable type VCB (vacuum circuit breaker)					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	1 Set of 11KV, 630 Amps (36KA), 3-phase, 50 Hz, trolley mounted fully withdrawable type Vacuum Circuit Breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12 / 24 / 48 / 110 volts D.C (without battery) . 2 Nos. 11 KV, cast resin insulated, dry type; double pole PT having ratio 11/0.11, burden 50VA, class 0.5 for metering & protection. 3 Nos. 11 KV cast resin insulated, dry type, double core CT of adequate current ratio (compatible with the transformer capacity), burden 10-15 VA, first core of class 0.5 M5 for metering and second core of class 10P10 for protection. 1 No of Triple pole solid-state microprocessor control IDMT relay with 2 elements of over current and short circuit protection and one for earth fault protection. 1 No. 415V, 6A (10KA) TPMCB for PT secondary protection. Assembled by the valid ISO-9001 certified company having test certificate (within at least 5 years) according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**1,053,421.00**	**1,053,421.00**	**1,053,421.00**	**1,053,421.00**

2.1.2 <u>11 KV RMU (RING MAIN UNIT)</u>

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Providing & supply of following metal clad / metal enclosed 11 KV, 3 phase, 50Hz, indoor type high tension double incoming and following number outgoing ring main unit (switchgear) made of sheet steel clad, dust and vermin proof, free standing floor mounting indoor type HT switchgear panel with 800 A, 3 phase hard drawn electrolytic copper bus bars incoming & outgoing both shall have common individual bus bar and all internal wiring and comprising of: INCOMING FEEDER (both VCB are interlocked)					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	11 KV, 31.5KA, 800 A, 3-phase, 50 Hz. metal clad trolley mounted fully withdrawable type vacuum circuit breaker complete with OFF load isolator for each incomer, 1no PT, motor operated spring charged stored energy mechanism for auto tripping at 12/24/48/110 volts DC (without battery) maximum service voltage 12 KV short circuit making current 50 KA having 4 NO+ 4 NC auxiliary contacts, capacitor compensated shunt tripping coil, closing solenoid. . 1 No. Cast resin insulated, double pole, Potential Transformer, ratio: 11/.11 KV, Class 0.5, 50 VA, (in open delta connection). 1 No. MCB of adequate rating for PT Secondary Protection. 3 Nos. Cast resin insulated, 11 KV dry type double cores CT with ratio adequate rating 1st core for metering, 2nd for protection. Core 1: 10 VA, Class 0.5M5 Core 2: 15 VA, Class 10P10. OUTGOING FEEDER 11 KV, 31.5KA, 800 A, 3-phase, 50Hz, metal clad trolley mounted fully withdrawable type vacuum circuit breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12/24/48/110 volts DC (without battery) maximum service voltage 12 KV short circuit making current 50 KA having 4 NO+ 4 NC auxiliary contacts, capacitor compensated shunt tripping coil, closing solenoid.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	1(set) Cast resin insulated, double pole, potential transformer, ratio: 11/.11 KV, Class 0.5, 50 VA, (in open delta connection). 1 No. MCB of adequate rating for PT secondary protection. 3 Nos. Cast resin insulated, 11 KV dry type double core CT with ratio adequate rating 1st core for metering, 2nd for protection Core 1:10VA, class 0.5M5 core 2:15 VA, class 10P10 3 Nos. Ammeter, adequate rating 1 No Voltmeter, 0-15 KV, with selector switch. 1 No. Triple pole solid state microprocessor operated IDMT relay with 2 (two) over current and 1 (one) earth fault protection element with standard settings. 2 Nos. ON and OFF push Button. 3 No's indicating lamps ON and OFF/TRIP 1 No. Panel heater.					
2.1.2.1	Incoming - 2 Outgoing - 2	Each	3,544,330.00	3,544,330.00	3,544,330.00	3,544,330.00
2.1.2.2	Incoming - 2 Outgoing - 3	Each	4,427,805.00	4,427,805.00	4,427,805.00	4,427,805.00
2.1.2.3	Incoming - 2 Outgoing - 4	Each	5,311,279.00	5,311,279.00	5,311,279.00	5,311,279.00
2.1.2.4	Incoming - 2 Outgoing - 5	Each	6,194,754.00	6,194,754.00	6,194,754.00	6,194,754.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.2.5	Incoming - 2 Outgoing - 6	Each	**7,078,229.00**	**7,078,229.00**	**7,078,229.00**	**7,078,229.00**
2.1.2.6	Incoming - 2 Outgoing - 7	Each	**7,961,704.00**	**7,961,704.00**	**7,961,704.00**	**7,961,704.00**
2.1.3	**SINGLE PHASE TRANSFORMER** Supply of following oil-immersed, natural air cooled, 1-phase, 50-Hz, 6.35 KV / 0.24 KV outdoor type distribution transformer having percentage impedance 3-3.5%, basic insulation level (BIL) 75 KV, HT & LV porcelain bushings, transformer tank, oil inlet & outlet valves, earthling terminals, data plate etc. including painting, suitable for connection with 11 KV line at 40°C ambient temperature with maximum temperature rise 60°C, manufactured and tested as per NEMA / VDE / IEC / BS standard along with BDS IEC 60076, PART 1: 2016 as per accepted / approved by the Engineer-in-charge. Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having test certificate (within at least five years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.					
2.1.3.1	(a) Capacity : **5 KVA** (b) No load loss : 50 watts (maximum) (c) Full load loss : 160 watts (maximum)	Each	**50,186.00**	**50,186.00**	**50,186.00**	**50,186.00**
2.1.3.2	(a) Capacity : **10 KVA** (b) No load loss : 70 watts (maximum) (c) Full load loss : 200 watts (maximum)	Each	**71,169.00**	**71,169.00**	**71,169.00**	**71,169.00**
2.1.3.3	(a) Capacity : **15 KVA** (b) No load loss : 80 watts (maximum) (c) Full load loss : 275 watts (maximum)	Each	**84,789.00**	**84,789.00**	**84,789.00**	**84,789.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.3.4	(a) Capacity : **25 KVA** (b) No load loss : 125 watts (maximum) (c) Full load loss : 375 watts (maximum)	Each	**118,042.00**	**118,042.00**	**118,042.00**	**118,042.00**
2.1.4	**OIL TYPE TRANSFORMER** Supply of following oil-immersed, natural air cooled, 3-phase, 50-Hz, 11KV/0.415 KV & 0.24 KV indoor/outdoor type distribution transformer of DYN11 vector group complete with two windings of high conductivity copper having basic impulse insulation level 75 KV , dielectric strength 28 KV (for 1 min), HT & LV porcelain bushings, manual 5 position (0, ±2.5%, ±5%) standard tap changer, conservator, thermometer, oil inlet & outlet valves, oil level indicator, dehydrating breather, lifting lugs, earthing terminals, wheel, rating and diagram nameplate etc. including painting, suitable for operation at 40°C ambient temperature with maximum temperature rise 60°C, locally manufactured and tested as per NEMA / VDE / IEC / BS standards along with BDS IEC 60076,PART 1 : 2016 as per accepted/approved by the Engineer-in-charge.					
2.1.4.1	(a) Capacity : **50 KVA** (b) No load loss : 250 watts (maximum) (c) Full load loss : 1200 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.1.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**264,964.00**	**264,964.00**	**264,964.00**	**264,964.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.2	(a) Capacity: **100 KVA** (b) No load loss : 300 watts (maximum) (c) Full load loss : 1750 watts (maximum) (d) Percentage Impedance : 4% @ ±10% at 75°C					
2.1.4.2.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**363,570.00**	**363,570.00**	**363,570.00**	**363,570.00**
2.1.4.3	(a) Capacity : **150 KVA** (b) No load loss : 350 watts (maximum) (c) Full load loss : 2400 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.3.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**481,896.00**	**481,896.00**	**481,896.00**	**481,896.00**
2.1.4.4	(a) Capacity : **200 KVA** (b) No load loss : 500 watts (maximum) (c) Full load loss : 2800 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.4.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**560,781.00**	**560,781.00**	**560,781.00**	**560,781.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.5	(a) Capacity : **250 KVA** (b) No load loss : 750 watts (maximum) (c) Full load loss : 4900 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.5.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**649,526.00**	**649,526.00**	**649,526.00**	**649,526.00**
2.1.4.6	(a) Capacity : **300/315 KVA** (b) No load loss : 800watts (maximum) (c) Full load loss : 5000 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.6.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**748,131.00**	**748,131.00**	**748,131.00**	**748,131.00**
2.1.4.7	(a) Capacity : **400 KVA** (b) No load loss : 850 watts (maximum) (c) Full load loss : 5200 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.7.1	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**927,472.00**	**927,472.00**	**927,472.00**	**927,472.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.8	(a) Capacity : **500 KVA** (b) No load loss : 1000 watts (maximum) (c) Full load loss : 5800 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.8.1	Manufactured by Govt. of BANGLADESH owned / shared company (GEMCO. Ltd.) or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**1,420,186.00**	**1,420,186.00**	**1,420,186.00**	**1,420,186.00**
2.1.4.8.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**1,069,358.00**	**1,069,358.00**	**1,069,358.00**	**1,069,358.00**
2.1.4.9	(a) Capacity: **600 / 630 KVA with buchholz relay.** (b) No load loss : 1200 watts (maximum) (c) Full load loss : 7500 watts (maximum) (d) Percentage impedance : 4% @ ±10% at 75°C					
2.1.4.9.1	Manufactured by Govt. of BANGLADESH owned / shared company (GEMCO. Ltd.) or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**1,620,624.00**	**1,620,624.00**	**1,620,624.00**	**1,620,624.00**
2.1.4.9.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**1,301,745.00**	**1,301,745.00**	**1,301,745.00**	**1,301,745.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.10	(a) Capacity: **800 KVA with buchholz relay.** (b) No load loss : 1400 watts (maximum) (c) Full load loss : 9000 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C					
2.1.4.10.1	Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**2,015,427.00**	**2,015,427.00**	**2,015,427.00**	**2,015,427.00**
2.1.4.10.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**1,683,793.00**	**1,683,793.00**	**1,683,793.00**	**1,683,793.00**
2.1.4.11	(a) Capacity: **1000 KVA with buchholz relay.** (b) No load loss : 1800 watts (maximum) (c) Full load loss : 12000 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C					
2.1.4.11.1	Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**2,382,315.00**	**2,382,315.00**	**2,382,315.00**	**2,382,315.00**
2.1.4.11.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**1,923,736.00**	**1,923,736.00**	**1,923,736.00**	**1,923,736.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.12	(a) Capacity: **1250 KVA with buchholz relay.** (b) No load loss : 2000 watts (maximum) (c) Full load loss : 15000 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C					
2.1.4.12.1	Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**2,868,226.00**	**2,868,226.00**	**2,868,226.00**	**2,868,226.00**
2.1.4.12.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**2,285,132.00**	**2,285,132.00**	**2,285,132.00**	**2,285,132.00**
2.1.4.13	(a) Capacity: **1500 / 1600 KVA with buchholz relay.** (b) No load loss : 2200 watts (maximum) (c) Full load loss : 18000 watts (maximum) (d) Percentage impedance : 6% @ ±10% at 75°C					
2.1.4.13.1	Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**3,111,181.00**	**3,111,181.00**	**3,111,181.00**	**3,111,181.00**
2.1.4.13.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**2,749,785.00**	**2,749,785.00**	**2,749,785.00**	**2,749,785.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.4.14	(a) Capacity: 2000 KVA with buchholz relay. (b) No load loss : 2400 watts (maximum) (c) Full load loss : 20000 watts (maximum) (d) Percentage impedance : 6% @ ±10% at 75°C					
2.1.4.14.1	Manufactured by Govt. of BANGLADESH owned / shared company or the valid ISO-9001 certified company having type test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.	Each	**4,131,595.00**	**4,131,595.00**	**4,131,595.00**	**4,131,595.00**
2.1.4.14.2	Manufactured by the valid ISO-9001 certified company having test certificate (within 5 years) for the required or higher capacity of transformer according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.	Each	**3,420,950.00**	**3,420,950.00**	**3,420,950.00**	**3,420,950.00**

2.1.5 DRY TYPE TRANSFORMER

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply of following dry type cast resin, natural air cooled, 3-phase, 50Hz, 11KV / 0.415 KV & 0.24 KV indoor type distribution transformer of DYN11 vector group having basic impulse insulation level 75 KV, HV & LV bushings, manual 5 position standard tap changer, complete with two windings of high conductivity aluminum foil with insulation material in class H, earthing terminals, temperature sensor with thermometer, thermostat controlled blower fan (if required), lifting lugs, data plate etc. complete as required with maximum 60°C temperature rise and suitable for operation at 40°C ambient temperature, at 75°C full load loss & impedance condition manufactured & type tested as per NEMA / IEC / VDE / BS / JIS standard along with BDS IEC 60076, PART 1: 2016 standards as per approval / acceptance by the Engineer-in-charge.					
2.1.5.1	(a) Capacity : **800 KVA** (b) No load loss : 1700 watts (maximum) (c) Full load loss : 7600 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C	Each	**2,232,001.00**	**2,232,001.00**	**2,232,001.00**	**2,232,001.00**
2.1.5.2	(a) Capacity : **1000 KVA** (b) No load loss : 2000 watts (maximum) (c) Full load loss : 8700 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C	Each	**3,019,766.00**	**3,019,766.00**	**3,019,766.00**	**3,019,766.00**
2.1.5.3	(a) Capacity : **1250 KVA** (b) No load loss : 2300 watts (maximum) (c) Full load loss : 10500 watts (maximum) (d) Percentage impedance : 5% @ ±10% at 75°C	Each	**3,510,586.00**	**3,510,586.00**	**3,510,586.00**	**3,510,586.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.5.4	(a) Capacity: **1500 / 1600 KVA.** (b) No load loss : 2800 watts (maximum) (c) Full load loss : 13500 watts (maximum) (d) Percentage impedance : 6% @ ±10% at 75°C	Each	**3,991,896.00**	**3,991,896.00**	**3,991,896.00**	**3,991,896.00**
2.1.5.5	(a) Capacity: **2000 KVA** (b) No load loss: 3500 watts (Maximum) (c) Full load loss: 16000 watts (Maximum) (d) Percentage Impedance : 6% @ ±10% at 75°C	Each	**4,568,915.00**	**4,568,915.00**	**4,568,915.00**	**4,568,915.00**
2.1.5.6	(a) Capacity: **2500 KVA.** (b) No load loss : 3600 watts (maximum) (c) Full load loss : 19500 watts (maximum) (d) Percentage impedance : 6% @ ±10% at 75°C	Each	**5,363,429.00**	**5,363,429.00**	**5,363,429.00**	**5,363,429.00**
2.1.5.7	(a) Capacity : **3000/3150 KVA** (b) No load loss : 4400 watts (maximum) (c) Full load loss : 24400 watts (maximum) (d) Percentage impedance : 7% @ ±10% at 75°C	Each	**6,092,296.00**	**6,092,296.00**	**6,092,296.00**	**6,092,296.00**

2.1.6 ENCLOSURE FOR CAST RESIN TANSFORMER:

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	The purpose of the enclosure is to provide safety from live parts, protect and make the equipment suitable for indoor conditions, prevent ingress of foreign matters, rodents, snakes etc. The material of enclosure used is CRCA sheet steel MS. The complete structure is rigid and self-supporting. To remove heat from the transformer, its louver has sufficient heat dissipation capability in indoor condition through the year without any additional cooling arrangements. The degree of ingress protection should not be less than IP 21 and fully enclosed type for indoor use:					
2.1.6.1	Enclosure (for 100 KVA – 250 KVA dry-type transformer)	Each	**153,381.00**	**153,381.00**	**153,381.00**	**153,381.00**
2.1.6.2	Enclosure (for 315 KVA – 500 KVA dry-type transformer)	Each	**184,057.00**	**184,057.00**	**184,057.00**	**184,057.00**
2.1.6.3	Enclosure (for 630 KVA – 800 KVA dry-type transformer)	Each	**214,733.00**	**214,733.00**	**214,733.00**	**214,733.00**
2.1.6.4	Enclosure (for 1000 KVA – 2000 KVA dry-type transformer)	Each	**276,086.00**	**276,086.00**	**276,086.00**	**276,086.00**
2.1.6.5	Enclosure (for 2500 KVA – 4000 KVA dry-type transformer)	Each	**337,438.00**	**337,438.00**	**337,438.00**	**337,438.00**
2.1.7	**LT SWITCHGEAR**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply of 415 V, 3-phase, 50 Hz, indoor type low tension switch-gear of following specification complete with digital voltmeter (0-500V) & ammeter of adequate rating both with selector switch, indicating lamps for ON-OFF and following components (components such as TPMCCBs shall be manufactured according to NEMA / VDE / IEC / JIS / BS standards along with relevant BDS standard shall have type test certificate (within 5 years) according to relevant IEC Standard) assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted / approved by the Engineer-in-charge. Panel board is provided with capacitive information level and all types of danger sign. All doors of panel board are connected by ECC with earthing bus bar. Assembled by the valid ISO-9001 certified company having test certificate (within at least five years) according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST. circuit Breaker equivalent accepted / approved by the Engineer-in-charge.					

2.1.7.1 **For 100 KVA transformer**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	INCOMING 1 Set- 415V, 200 amps. TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 150 / 160 Amps (25KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 200 / 5 ratio current transformer with suitable accuracy & burden. OUTGOING 3 Nos. - 415V, 100A (16KA) TPMCCB with thermal over load & instantaneous electromagnetic short-circuit release. (one for PFI Control) 1 No. - 415V, 32 / 30A (16KA) TPMCCB with thermal over load & instantaneous electromagnetic short circuit release.	Each	**185,624.00**	**185,624.00**	**185,624.00**	**185,624.00**

2.1.7.2 **For 150 KVA transformer**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	INCOMING 1 Set- 415V, 300A TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 250A (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 250/5 ratio current transformer with suitable accuracy & burden. OUTGOING 2 Nos. - 415V, 150/160A (25KA), adjustable type TPMCCB with thermal overload & instantaneous electromagnetic short-circuit release (one for PFI control). 1 Nos. - 415V, 100A (16KA), TPMCCB with thermal overload & instantaneous electromagnetic short circuit release 1 Nos. - 415V, 60/63A (16KA) TPMCCB with thermal over load & instantaneous electro-magnetic short-circuit release. 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal over load & instantaneous electromagnetic short-circuit release.	Each	**219,948.00**	**219,948.00**	**219,948.00**	**219,948.00**
2.1.7.3	**For 200 KVA transformer:** INCOMING 1 Set- 415V, 400 amps. TP&NE hard drawn electrolytic copper bus bar 1 No. - 415V, 300 / 320 Amps (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electromagnetic short circuit release. 3 no.s-415V, 300/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electromagnetic short circuit release (for PFI control). 1 No. - 415V, 150/160 (25KA) adjustable type TPMCCB with thermal overload & instantaneous electromagnetic short circuit release 2 Nos. - 415V, 100A (25KA) TPMCCB with thermal over current & instantaneous electromagnetic short circuit release. 1 No. - 415V, 60/63A (16KA), TPMCCB with thermal overload & instantaneous electromagnetic short-circuit release. 1 No. - 415V, 30/32A (16KA) TPMCCB with thermal overload & instantaneous electromagnetic short-circuit release.	Each	**260,748.00**	**260,748.00**	**260,748.00**	**260,748.00**

2.1.7.4 **For 250 KVA transformer :**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	INCOMING 1 Set- 415V, 500 amps. TP&NE hard drawn electrolytic copper bus bar. 1 No. - 400 Amps (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 400/5 ratio current transformer with suitable accuracy & burden. OUTGOING 1 No. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short-circuit & release (for PFI control). 2 Nos. - 415V, 150 / 160A (25KA) adjustable type TPMCCB with thermal overload & instantaneous electromagnetic short circuit & release. 2 Nos. - 415V, 100A (16KA) TPMCCB with thermal overload & instantaneous electromagnetic short-circuit & release. 1 No. - 415V, 60 / 63A (16KA) TPMCCB with thermal overload & instantaneous electromagnetic short-circuit & release. 1 No. - 415V, 30/32A (16KA) TPMCCB with thermal overload & instantaneous electromagnetic short-circuit & release.	Each	**307,376.00**	**307,376.00**	**307,376.00**	**307,376.00**
2.1.7.5	**For 300 / 315 KVA transformer :** INCOMING 1 Set - 415V, 600 amps TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 500 Amps (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 500/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 300A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electromagnetic short circuit release (For PFI Control). 1 No. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 150 / 160A (25KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 60/63A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.	Each	**339,432.00**	**339,432.00**	**339,432.00**	**339,432.00**
2.1.7.6	**For 400 KVA transformer:** INCOMING 1 Set - 415V, 800A TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 600 / 630A (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 No's. - 415V, 600/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1No. - 415V, 400A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release (for PFI Control). 1 No. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 150 / 160A (25KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release 1 No. - 415V, 60 / 63A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release	Each	**423,945.00**	**423,945.00**	**423,945.00**	**423,945.00**

2.1.7.7 **For 500 KVA transformer:**

INCOMING

1 Set - 415V, 1000 amps TP&NE hard drawn electrolytic copper bus bar.

1 No. - 415V, 800 Amps (50KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release.

3 Nos. - 415V, 800/5 ratio current transformer with suitable accuracy & burden.

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No.-415V, 500 Amps (36KA), adjustable type TPMCCB for main control with thermal overload & instantaneous electro-magnetic short circuit release (for PFI control). 2 Nos. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 150 / 160A (25KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 60 / 63A (16KA) 415V TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) 415V TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.					
		Each	**578,063.00**	**578,063.00**	**578,063.00**	**578,063.00**
2.1.7.8	**For 600 / 630 KVA transformer:** INCOMING 1 Set - 415V, 1200A, TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 1000A (65KA), adjustable type ACB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 No's - 415V, 1000/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 600A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release (for PFI control). 3 Nos. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 150/160A (25KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 100A (16KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) 415V TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.	Each	**762,549.00**	**762,549.00**	**762,549.00**	**762,549.00**
2.1.7.9	**For 800 KVA transformer:** INCOMING 1 Set - 415V, 1500 amps TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 1200/1250 Amps (65KA), adjustable type ACB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 1200/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 800A (50KA) adjustable type TPMCCB with instantaneous electro-magnetic short circuit release (for PFI control). 2 Nos. - 415V, 300 / 320A (36KA) adjustable type TPMCCB with instantaneous electro-magnetic short circuit release. 4 Nos. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 150/160A (25KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.					
		Each	**875,622.00**	**875,622.00**	**875,622.00**	**875,622.00**
2.1.7.10	**For 1000 KVA transformer**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	INCOMING 1 Set- 415V, 1800 TP & NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 1600A (65KA), adjustable type ACB for main control overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 1600 / 5 ratio current transformer with suitable accuracy & burden. OUTGOING 1 No. - 415V, 1000A (65 KA) adjustable type ACB with thermal overload & instantaneous electro-magnetic short circuit release (for PFI control). 2 Nos. - 415V, 300 / 320A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 6 Nos. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 100A (16KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.	Each	**1,359,508.00**	**1,359,508.00**	**1,359,508.00**	**1,359,508.00**
2.1.7.11	**For 1250 KVA transformer** INCOMING 1 Set- 415V, 2500A TP & NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 2000A (65KA), adjustable type ACB for main control overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 2000 / 5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 1250A (65KA) adjustable type ACB with instantaneous electro-magnetic short circuit release. (For PFI control). 1 No. - 415V, 400A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 300 /320A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 4 Nos. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 80A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30 / 32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.	Each	**1,543,995.00**	**1,543,995.00**	**1,543,995.00**	**1,543,995.00**
2.1.7.12	**For 1500 / 1600 KVA Transformer** INCOMING 1 Set - 415V, 3000 amps TP&NE hard drawn electrolytic copper bus bar. 1 No. - 415V, 2200A (65KA), adjustable type ACB for main control with thermal overload & instantaneous electro-magnetic short circuit release. 3 Nos. - 415V, 2500/5 ratio current transformer with suitable accuracy & burden.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING 1 No. - 415V, 1600A (65KA) adjustable type ACB with instantaneous electro-magnetic short circuit release (for PFI control). 1 No. - 415V, 600A (36KA) adjustable type TPMCCB with instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 400A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 4 Nos. - 415V, 300/320A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 2 Nos. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 100A (16KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30/32A (16KA) TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release.	Each	**1,740,384.00**	**1,740,384.00**	**1,740,384.00**	**1,740,384.00**

2.1.7.13 **For 2000 KVA transformer**

INCOMING

1 Set. - 415V, 3200A TP & NE hard drawn electrolytic copper bus bar.

1 No. - 415V, 3000A (65KA), adjustable type ACB for main control with thermal overload & instantaneous electro-magnetic short circuit release.

3 Nos. - 415V, 3000 / 5 ratio current transformer with suitable accuracy & burden.

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	OUTGOING : 1 No. - 415V, 2000A (65KA) adjustable type ACB with instantaneous electro-magnetic short circuit release. (for PFI control). 2 Nos. - 415V, 600A (36KA) adjustable type TPMCCB with instantaneous electro-magnetic short circuit release. 4 Nos. - 415V, 400A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 4 Nos. - 415V, 300/320A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 250A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 200A (36KA) adjustable type TPMCCB with thermal overload & instantaneous electro-magnetic short circuit release. 1 No. - 415V, 30/32A (16KA) TPMCCB with thermal overload & instantaneous electromagnetic short circuit release.	Each	**2,365,259.00**	**2,365,259.00**	**2,365,259.00**	**2,365,259.00**

2.1.8 POWER FACTOR IMPROVEMENT PANEL (PFI)

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply of following 415 volt, 3 phase, 50 Hz power factor improvement panel complete with TP bus bars and earth block, microprocessor controlled auto power factor correction relay with digital PF reading display, capacitor bank, contactor, fuse, ON indicators for every stage of capacitor bank (except directly connected one) etc. shall be manufactured & tested as per NEMA / VDE / IEC / JIS / BS standards along with relevant BDS standard assembled locally in 16 SWG sheet steel clad dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted / approved by the Engineer-in-charge. Assembled by the valid ISO-9001 certified company having test certificate (within five years) according to relevant IEC standards from BUET /RUET/ CUET / KUET /DUET/ MIST.					
2.1.8.1	**For 100 KVA transformer (PFI capacity - 60 KVAR)** 3 Nos. - 415V, 150A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	5 No. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 No. - 415V, 10 A 50 Hz auto TP magnetic contactor with AC3 duty. 5 Nos. - 415V, 16 A, 50 Hz auto TP magnetic contactor with AC3 duty. 9 Nos. - 415V, 10 A HR.C fuse with base. 15 Nos. - 415V, 20 A HR.C fuse with base.	Each	**166,265.00**	**166,265.00**	**166,265.00**	**166,265.00**
2.1.8.2	**For 150 KVA transformer (PFI capacity - 90 KVAR)** 3 Nos. - 415V, 200A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in/separate discharge resistor. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in/separate discharge resistor. 6 Nos. - 415V, 12.5 KVAR, 50 Hz TP power capacitor bank with built in/separate discharge resistor. 3 Nos. - 415V, 10 A 50 Hz TP magnetic contactor with AC3 duty. 6 Nos. - 415V, 20 A 50 Hz TP magnetic contactor with AC3 duty. 9 Nos. - 415V, 10 A HR.C fuse with base. 18 Nos. - 415V, 25 A HR.C fuse with base.	Each	**195,407.00**	**195,407.00**	**195,407.00**	**195,407.00**
2.1.8.3	**For 200 KVA transformer (PFI capacity - 120 KVAR)**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	3 Nos. - 415V, 250A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built-in discharge resistor. 3 Nos. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in discharge resistor. 4 Nos. - 415V, 20 KVAR 50 Hz TP power capacitor bank with built in discharge resistor. 2 Nos. - 415V, 10A 50 Hz TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 16A 50 Hz TP magnetic contactor with AC3 duty. 4 Nos. - 415V, 32A 50 Hz TP magnetic contactor with AC3 duty. 9 Nos. - 415V, 10A HR.C fuses with base. 9 Nos. 415V, 20A HR.C fuses with base. 12 Nos. - 415V, 40A HR.C fuses with base.					
2.1.8.4	**For 250 KVA transformer (PFI capacity - 150 KVAR)** 3 Nos. - 415V, 300A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse.	Each	**226,881.00**	**226,881.00**	**226,881.00**	**226,881.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 Nos. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 12.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 7 Nos. - 415V, 20 A 50 Hz auto TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 24 Nos. - 415V, 25 A HR.C fuse with base. 9 Nos. - 415V, 50 A HR.C fuse with base	Each	**271,178.00**	**271,178.00**	**271,178.00**	**271,178.00**
2.1.8.5	**For 300 / 315 KVA transformer (PFI capacity - 187.5 KVAR)** 3 No's- 415V, 400A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in/ separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 12.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	4 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 6 Nos. - 415V, 20A 50 Hz TP magnetic contactor with AC3 duty. 7 Nos. - 415V, 40A 50 Hz TP magnetic contactor with AC3 duty. 22 Nos. - 415V, 25A HR.C fuse with base. 20 Nos. - 415V, 50A HR.C fuse with base.	Each	**317,806.00**	**317,806.00**	**317,806.00**	**317,806.00**
2.1.8.6	**For 400 KVA transformer (PFI capacity - 240 KVAR)** 3 Nos. - 415V, 500A hard drawn electrolytic copper bus bar. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor 3 Nos. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 Nos. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 10 A 50 Hz auto TP magnetic contactor with AC3 duty.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	4 Nos. - 415V, 16 A 50 Hz auto TP magnetic contactor with AC3 duty. 5 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 2 Nos. - 415V, 80 A 50 Hz auto TP magnetic contactor with AC3 duty. 6 Nos. - 415V, 16 A HR.C fuse with base. 15 Nos. - 415V, 20 A HR.C fuse with base. 12 Nos. - 415V, 50 A HR.C fuse with base. 6 Nos. - 415V, 100 A HR.C fuse with base.					
		Each	**376,090.00**	**376,090.00**	**376,090.00**	**376,090.00**
2.1.8.7	**For 500 KVA transformer (PFI capacity - 300 KVAR)** 3 Nos. - 415V, 600A hard drawn electrolytic copper bus bar. . 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 1 No. - 415V, 2.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 16 A 50 Hz TP magnetic contactor with AC3 duty. 6 Nos. - 415V, 20 A 50 Hz TP magnetic contactor with AC3 duty.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	4 Nos. - 415V, 40 A 50 Hz TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 80 A 50 Hz TP magnetic contactor with AC3 duty. 9 Nos. - 415V, 16 A HR.C fuse with base. 12 Nos. - 415V, 25 A HR.C fuse with base. 15 Nos. - 415V, 50 A HR.C fuse with base. 9 Nos. - 415V, 100 Amp HR.C fuse with base.	Each	**435,602.00**	**435,602.00**	**435,602.00**	**435,602.00**
2.1.8.8	**For 600 / 630 KVA transformer (PFI capacity - 375 KVAR)** 4 Nos. - 415V, 750A hard drawn electrolytic copper bus bar. 1 No. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 2 Nos. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 10 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 Nos. - 415V, 12.5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 5 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	2 No. - 415V, 16 A 50 Hz auto TP magnetic contactor with AC3 duty. 3 No. - 415V, 20 A 50 Hz auto TP magnetic contactor with AC3 duty. 3 No. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 5 Nos. - 415V, 80 A 50 Hz auto TP magnetic contactor with AC3 duty. 18 Nos. - 415V, 25 A HR.C fuse with base. 9 Nos. - 415V, 50 A HR.C fuse with base. 15 Nos. - 415V, 100 A HR.C fuse with base.					
		Each	**522,048.00**	**522,048.00**	**522,048.00**	**522,048.00**
2.1.8.9	**For 800 KVA transformer (PFI capacity - 480 KVAR)** 3 Nos. - 415V, 900A hard drawn electrolytic copper bus bar. 1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 4 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 Nos. - 415V, 5 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 5 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 1 No. - 415V, 100 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 1 Nos. - 415V, 10 A 50 Hz auto TP magnetic contactor with AC3 duty.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	5 Nos. - 415V, 80 A 50 Hz auto TP magnetic contactor with AC3 duty. 1 No. - 415V, 160 A 50 Hz auto TP magnetic contactor with AC3 duty. 15 Nos. - 415V, 50 A HR.C fuse with base. 3 Nos. - 415V, 10 A HR.C fuse with base. 15 Nos. - 415V, 100 A HR.C fuse with base. 3 Nos. - 415V, 200 A HR.C fuse with base.					
		Each	**635,120.00**	**635,120.00**	**635,120.00**	**635,120.00**
2.1.8.10	**For 1000 KVA transformer (PFI capacity - 600 KVAR)** 3 Nos. - 415V, 1200A hard drawn electrolytic copper bus bar. 1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 3 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 100 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 40 A 50 Hz TP magnetic contactor with AC3 duty. 4 Nos. - 415V, 80 A 50 Hz TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 160 A 50 Hz TP magnetic contactor with AC3 duty. 12 Nos. - 415V, 50 A HR.C fuse with base. 12 Nos. - 415V, 100 A HR.C fuse with base. 9 Nos. - 415V, 200 A HR.C fuse with base.	Each	**737,518.00**	**737,518.00**	**737,518.00**	**737,518.00**
2.1.8.11	**For 1250 KVA transformer (PFI capacity - 750 KVAR)**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	3 Nos. - 415V, 1500A hard drawn electrolytic copper bus bar. 1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 3 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 5 Nos. - 415V, 100 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 80 A 50 Hz auto TP magnetic contactor with AC3 duty. 5 Nos. - 415V, 160 A 50 Hz auto TP magnetic contactor with AC3 duty. 12 Nos. - 415V, 50 A HR.C fuse with base. 9 Nos. - 415V, 100 A HR.C fuse with base. 15 Nos. - 415V, 200 A HR.C fuse with base.	Each	**945,809.00**	**945,809.00**	**945,809.00**	**945,809.00**

2.1.8.12 **For 1500/1600 KVA transformer (PFI capacity - 900/960 KVAR)**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	3 Nos. - 415V, 1800A hard drawn electrolytic copper bus bar. 1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 3 Nos.-415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 4 Nos. - 415V, 50 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 6 Nos. - 415V, 100 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 4 Nos. - 415V, 80 A 50 Hz auto TP magnetic contactor with AC3 duty. 6 Nos. - 415V, 160 A 50 Hz auto TP magnetic contactor with AC3 duty. 12 Nos. - 415V, 50 A HR.C fuse with base. 12 Nos. - 415V, 100 A HR.C fuse with base. 18 Nos. - 415V, 200 A HR.C fuse with base.					
		Each	**1,005,321.00**	**1,005,321.00**	**1,005,321.00**	**1,005,321.00**

2.1.8.13 **For 2000 KVA transformer (PFI capacity - 1200 KVAR)**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	3 Nos. - 415V, 2000A hard drawn electrolytic copper bus bar. 1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse. 2 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 3 Nos. - 415V, 75 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 6 Nos. - 415V, 150 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor. 2 Nos. - 415V, 40 A 50 Hz auto TP magnetic contactor with AC3 duty. 3 Nos. - 415V, 125 A 50 Hz auto TP magnetic contactor with AC3 duty. 6 Nos. - 415V, 250 A 50 Hz auto TP magnetic contactor with AC3 duty. 9 Nos. - 415V, 50 A HR.C fuse with base. 9 Nos. - 415V, 150 A HR.C fuse with base. 18 Nos. - 415V, 300 A HR.C fuse with base.					
		Each	**1,225,515.00**	**1,225,515.00**	**1,225,515.00**	**1,225,515.00**
2.1.9	**HT METERING UNIT** Supply of HT metering unit for 11kv sub-station with TP hard drawn electrolytic copper bus bar earth link bars manufacture 16 SWG power coat painted louver sheet steel metal enclosed free standing floor mounting dust and vermin proof completely factory assembled & suitable for indoor use including all standard IP54 accessories manufactured & type tested in accordance with NEMA / IEC / JIS along with relevant BDS standards (Country of origin: USA / Japan / EU countries or relevant electricity supply authority and as per approved/accepted by the Engineer-in-charge).					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	1 no. 3-phase 4 wire single/double tariff solid state programmable KWH meter with LCD display, MDI on kw integration period 30 minutes. 3 nos. cast resin PT Ratio: 11000 : root 3/110v : root 3 Burden: 50VA, class : 0.5 for metering 1 no. TPMCCB for PT secondary protection 3 nos. cast resin CT……/ 5A (adequate rating to be inserted) 15 VA class 0.5 M5 for metering with selector switch 3 nos. indicating light phase indicator RYB 1 set cable Test Terminal (TT) block with cover 1 no. panel heater.					
2.1.9.1	**Up to 3000 KVA**	Each	**429,160.00**	**429,160.00**	**429,160.00**	**429,160.00**
2.1.10	**LIGHTNING ARRESTER & DROPOUT FUSE**					
2.1.10.1	Supply of outdoor type11 KV, 50 Hz, 100A, (10 KA), 75 KV BIL lightning arrester complete with mounting accessories etc. Made in BANGLADESH / BRAZIL or EU countries. (3 Nos. in a set).	Set	**19,019.00**	**19,019.00**	**19,019.00**	**19,019.00**
2.1.10.2	Supply of outdoor type 11KV, 50 Hz, 5KA (20 KA) dropout fuse complete with mounting accessories etc. Made in BANGLADESH / BRAZIL or EU countries. (3 Nos. in a set).	Set	**25,154.00**	**25,154.00**	**25,154.00**	**25,154.00**
2.1.11	**IRON CHANNEL**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Providing & fixing U-channel iron cross-arm of size 38 mm x 76 mm x 38 mm x 6.35mm. (1.5" x 3" x 1.5" x 0.25") on single pole / H-pole with the help of necessary clamps, nuts, bolts etc. including making required no. of holes on the cross-arm for fixing of drop out fuse, lightning arrester including two coats of superior quality aluminum painting over required prime coat of anti-corrosive red-oxide painting complete as required & as per instruction of the Engineer-in-charge.	Meter	1,104.00	1,104.00	1,104.00	1,104.00
2.1.12	**INSTALLATION**					
	Installations, testing and commissioning of following 11 KV, 50 Hz. 3-phase, indoor type HT switchgear and HT Meter on prepared foundation with the help of necessary tools, plants, skilled labour & technician as per direction of the Engineer-in-charge.					
2.1.12.1	Load Break Switch.	Job	8,589.00	8,435.00	7,851.00	7,851.00
2.1.12.2	Withdrawable Type Vacuum Circuit Breaker	Job	14,725.00	14,460.00	13,458.00	13,458.00
2.1.12.3	HT meter	Job	12,270.00	12,050.00	11,215.00	11,215.00
2.1.12.4	RMU	Job	24,541.00	24,099.00	22,430.00	22,430.00
2.1.13	**INSTALLATION OF TRANSFORMER**					
	Installation, testing and commissioning of following 11 KV/ 0.415KV transformer on prepared platform on pole / CC foundation with the help of necessary tools & plants, skilled labour & technician as per direction of the Engineer-in-charge.					
2.1.13.1	Single phase transformer on pole.					
2.1.13.1.1	5-25 KVA 1 phase transformer on pole	Job	3,681.00	3,615.00	3,365.00	3,365.00
2.1.13.2	3 phase transformer on H-pole.					
2.1.13.2.1	50 KVA 3 phase transformer on H. pole.	Job	6,135.00	6,025.00	5,608.00	5,608.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.13.2.2	100-150 KVA 3 phase transformer on H. pole.	Job	**8,589.00**	**8,435.00**	**7,851.00**	**7,851.00**
2.1.13.2.3	200-250 KVA 3 phase transformer on H. pole.	Job	**12,270.00**	**12,050.00**	**11,215.00**	**11,215.00**
2.1.13.3	3 phase transformer on CC pad with proper fencing.(min 6 feet height made of MS angle/flat bar with duly painted)					
2.1.13.3.1	50 KVA 3 phase transformer on CC pad with proper fencing. .	Job	**28,104.00**	**27,598.00**	**25,687.00**	**25,687.00**
2.1.13.3.2	100-150 KVA 3 phase transformer on CC pad with proper fencing..	Job	**29,670.00**	**29,136.00**	**27,119.00**	**27,119.00**
2.1.13.3.3	200-315 KVA 3 phase transformer on CC pad with proper fencing.	Job	**35,088.00**	**34,457.00**	**32,071.00**	**32,071.00**
2.1.13.3.4	400-630KVA3 phase transformer on CC pad with proper fencing.	Job	**41,628.00**	**40,879.00**	**38,048.00**	**38,048.00**
2.1.13.3.5	800-1000KVA 3 phase transformer on CC pad with proper fencing.	Job	**51,145.00**	**50,224.00**	**46,747.00**	**46,747.00**
2.1.13.3.6	1250-1600 KVA3 phase transformer on CC pad with proper fencing.	Job	**67,866.00**	**66,645.00**	**62,030.00**	**62,030.00**
2.1.13.3.7	2000 KVA 3 phase transformer on CC pad with proper fencing.	Job	**70,494.00**	**69,225.00**	**64,431.00**	**64,431.00**
2.1.14	**INSTALLATION,TESTING,COMMISSIONING OF LT SWITCHGEAR/PFI PLANT** Installation, testing and commissioning of 415V, 3-phase, 50 Hz indoor type LT switchgear / PFI panel suitable for following capacity transformer on prepared CC foundation with the help of necessary tools & plants, skilled labour & technician as per direction of the Engineer-in-charge.					
2.1.14.1	For 100-150 KVA transformer	Job	**4,908.00**	**4,820.00**	**4,486.00**	**4,486.00**
2.1.14.2	For 200-400KVA transformer	Job	**6,749.00**	**6,627.00**	**6,168.00**	**6,168.00**
2.1.14.3	For 500-600 KVA transformer	Job	**7,976.00**	**7,832.00**	**7,290.00**	**7,290.00**
2.1.14.4	For 800-1000 KVA transformer	Job	**9,816.00**	**9,640.00**	**8,972.00**	**8,972.00**
2.1.14.5	For 1250-1500 KVA transformer	Job	**13,498.00**	**13,255.00**	**12,337.00**	**12,337.00**
2.1.14.6	For 2000 KVA transformer	Job	**15,338.00**	**15,062.00**	**14,019.00**	**14,019.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.15	**INSTALLATION OF DROP OUT FUSE/ LIGHTNING ARRESTER** Installation of HT drop out fuse/ lightning arrester on prepared U-channel cross-arm on single / H-pole with necessary fixing materials complete as per instruction of the Engineer-in-charge.					
2.1.15.1	**Drop out fuse.**	Job	**1,227.00**	**1,205.00**	**1,122.00**	**1,122.00**
2.1.15.2	**Lightning arrester.**	Job	**1,227.00**	**1,205.00**	**1,122.00**	**1,122.00**
2.1.16	**SUBSTATION MAINTENANCE/SERVICING** Yearly checking, testing cleaning, servicing and re-commissioning of the following 11 / 0.415 KV electrical sub-station equipment (mainly transformer, circuit breakers, isolating switch, load break switch, relays, measuring devices, capacitor banks, contacts, control wiring, bushing, oils terminals etc.) by trained and skilled manpower with performing insulation tests, Earth resistance tests, injection tests and oil tests (from BRTC, BUET / CRS PDB) as per appendix-A and as per direction of the Engineer in Charge.					
2.1.16.1	**FOR TRANSFORMER**					
2.1.16.1.1	100 KVA to 500 KVA (Three Times in a year)	Job	**18,406.00**	**18,406.00**	**18,406.00**	**18,406.00**
2.1.16.1.2	600 KVA to 1000 KVA (Three Times in a year)	Job	**24,541.00**	**24,541.00**	**24,541.00**	**24,541.00**
2.1.16.1.3	1250 KVA and above (Three Times in a year)	Job	**30,676.00**	**30,676.00**	**30,676.00**	**30,676.00**
2.1.16.2	**H.T SWITCHGEAR WITH**					
2.1.16.2.1	SF6 breaker/VCB/OCB/MOCB (Three Times in a year)	Job	**24,541.00**	**24,541.00**	**24,541.00**	**24,541.00**
2.1.16.2.2	Load break switch (LBS) (Three Times in a year)	Job	**14,725.00**	**14,725.00**	**14,725.00**	**14,725.00**
2.1.16.3	**L.T. SWITCH GEAR WITH**					
2.1.16.3.1	Up to 800 KVA sub-station (Three Times in a year)	Job	**14,725.00**	**14,725.00**	**14,725.00**	**14,725.00**
2.1.16.3.2	1000 KVA and above sub-station. (Three Times in a year)	Job	**29,449.00**	**29,449.00**	**29,449.00**	**29,449.00**
2.1.16.4	**POWER FACTOR IMPROVEMENT PLANT**					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.16.4.1	Up to 400 KVAR capacity (Three Times in a year)	Job	**19,633.00**	**19,633.00**	**19,633.00**	**19,633.00**
2.1.16.4.2	Above 400 KVAR capacity (Three Times in a year)	Job	**23,559.00**	**23,559.00**	**23,559.00**	**23,559.00**
2.1.17	**TRANSFORMER REPAIRING** Full-rewinding of following oil immersed natural air cooled 3 phase, 50 Hz, 11 KV/0.415 KV & 0.24KV distribution X-former with existing size of HT super enamel wire, copper stripe, insulation paper / board, ampere tube, cotton tape, nitto varnish etc. as required including replacing the existing transformer oil by proper grade good quality transformer oil, painting inside / outside surface, reinstallation, testing, commissioning including carrying, loading, unloading both ways and performing all necessary testing like full load loss, no load loss, insulator resistance as per direction of the Engineer-in-charge. The transformer shall be of DYN11 vector group having percentage impedance 4-6.5%, basic insulation label 75 KV suitable for operation at 40 °C ambient temperature with maximum temperature rise to 60 °C (dismantle wires shall be taken by the contractor).					
2.1.17.1	50 KVA transformer repairing	Job	**137,429.00**	**137,429.00**	**137,429.00**	**137,429.00**
2.1.17.2	100 KVA transformer repairing	Job	**168,106.00**	**168,106.00**	**168,106.00**	**168,106.00**
2.1.17.3	150 KVA transformer repairing	Job	**200,009.00**	**200,009.00**	**200,009.00**	**200,009.00**
2.1.17.4	200 KVA transformer repairing	Job	**262,588.00**	**262,588.00**	**262,588.00**	**262,588.00**
2.1.17.5	250 KVA transformer repairing	Job	**299,400.00**	**299,400.00**	**299,400.00**	**299,400.00**
2.1.17.6	315 KVA transformer repairing	Job	**355,844.00**	**355,844.00**	**355,844.00**	**355,844.00**
2.1.17.7	400 KVA transformer repairing	Job	**512,906.00**	**512,906.00**	**512,906.00**	**512,906.00**
2.1.17.8	500 KVA transformer repairing	Job	**543,582.00**	**543,582.00**	**543,582.00**	**543,582.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.18	**SPARES FOR SUBSTATION EQUIPMENT**					
	Supplying of the following components / equipment's suitable for use at 11 / 0.415 / 0.240 KV substation & power supply system, manufactured and tested in accordance with NEMA / IEC / VDE/ BS / JIS standards along with BDS standard accepted / approved by the Engineer-in-charge.					
2.1.18.1	11KV, 3 - phase, 50Hz HT LBS unit, 630 A, 20KA.	Each	322,714.00	322,714.00	322,714.00	322,714.00
2.1.18.2	11KV, 3 - phase, 50Hz HT VCB / SF6 circuit breaker, 630A, 20KA .	Each	678,558.00	678,558.00	678,558.00	678,558.00
2.1.18.3	11KV, 50Hz, 50VA, 11 / 0.11 ratio cast resin insulated potential transformer (PT) class 0.5.	Each	37,425.00	37,425.00	37,425.00	37,425.00
2.1.18.4	11 KV, 50Hz, 10-15VA adequate ratio, double core cast resin insulated current transformer (CT).	Each	37,425.00	37,425.00	37,425.00	37,425.00
2.1.18.5	11KV, 50Hz, 15VA, adequate ratio, single core cast resin insulated current transformer (CT).	Each	31,290.00	31,290.00	31,290.00	31,290.00
2.1.18.6	Microprocessor controlled three-phase 50Hz IDMT relay for 11KV switchgear.	Each	86,507.00	86,507.00	86,507.00	86,507.00
2.1.18.7	11KV, porcelain bushing (for transformer capacity up to 2MVA).	Each	3,436.00	3,436.00	3,436.00	3,436.00
2.1.18.8	500V, porcelain bushing (for transformer capacity up to 2 MVA).	Each	3,436.00	3,436.00	3,436.00	3,436.00
2.1.18.9	Thermostat controlled panel heater for 11KV, 50Hz switchgear.	Each	9,939.00	9,939.00	9,939.00	9,939.00
2.1.18.10	Buchholz relay for 11 / 0.415 & 0.24KV 3 - phase, 50 Hz transformer.	Each	61,475.00	61,475.00	61,475.00	61,475.00
2.1.19	**CAPACITOR BANK**					
	415V, 50Hz, 3 phase, capacitor bank of following capacity :-					
2.1.19.1	2.5 KVAR	Each	5,031.00	5,031.00	5,031.00	5,031.00
2.1.19.2	5KVAR	Each	5,031.00	5,031.00	5,031.00	5,031.00
2.1.19.3	7.5KVAR	Each	7,485.00	7,485.00	7,485.00	7,485.00
2.1.19.4	10KVAR	Each	9,589.00	9,589.00	9,589.00	9,589.00
2.1.19.5	12.5KVAR	Each	9,939.00	9,939.00	9,939.00	9,939.00
2.1.19.6	20KVAR	Each	17,694.00	17,694.00	17,694.00	17,694.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.19.7	25KVAR	Each	18,528.00	18,528.00	18,528.00	18,528.00
2.1.20	**POWER FACTOR CORRECTION RELAY**					
2.1.20.1	PFC relay 6 stages -	Each	19,694.00	19,694.00	19,694.00	19,694.00
2.1.20.2	PFC relay 9 stages -	Each	24,602.00	24,602.00	24,602.00	24,602.00
2.1.20.3	PFC relay 12 stages -	Each	33,437.00	33,437.00	33,437.00	33,437.00
2.1.21	**Oil level indicator for 11/0.415 & .024 KV transformer.**	Each	6,197.00	6,197.00	6,197.00	6,197.00
2.1.22	**Silica Gel Breather container for transformer.**	Each	3,742.00	3,742.00	3,742.00	3,742.00
2.1.23	**Silica Gel for Transformer breather.**	Kg	1,153.00	1,153.00	1,153.00	1,153.00
2.1.24	**TRANSFORMER OIL**	Litre	325.00	325.00	325.00	325.00
2.1.25	**CT (Current Transformer for REB standard)** Rated System Voltage : 15 KV CT Ratio : Adequate rating Rated Secondary Burden : B 0.5 Class of Accuracy : 0.3 STC : 15 kA/sec BIL : 15/34/110 KV Rated Frequency : 50 Hz Standard : ANSI C 57.13 / IEEE 3 (three) in one set.	Set	221,482.00	221,482.00	221,482.00	221,482.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.26	**PT- (Potential Transformer for REB standard)** Rated System Voltage : 15 KV CT Ratio : 6350/240 V Rated Secondary Burden : Y Class of Accuracy : 0.3 BIL : 15/34/110 KV Rated Frequency : 50 Hz Standard : ANSI C 57.13 / IEEE 3 (three) in one set.	Set	**221,482.00**	**221,482.00**	**221,482.00**	**221,482.00**
2.1.27	**CAPACITY CONTOL CIRCUIT BREAKER FEEDER UNIT** Supplying of 415V, 3 phase, 50Hz following capacity control circuit breaker feeder unit as per following specification with thermal over current & instantaneous electromagnetic short-circuit release manufactured and tested as per NEMA / IEC / VDE / BS / JIS along with relevant BDS standards (adjustable type above 100A rating) for sub-station L.T panel. Rated operating voltage : 220-690 V. Rated insulation voltage : 690 volt. Rated impulse withstand voltage : 6KV. Utilization category : A or B accepted / approved by the Engineer-in-charge.					
2.1.27.1	30A / 32A (16KA) TPMCCB	Each	**8,393.00**	**8,393.00**	**8,393.00**	**8,393.00**
2.1.27.2	40A(16KA) TPMCCB	Each	**8,393.00**	**8,393.00**	**8,393.00**	**8,393.00**
2.1.27.3	50A (16KA) TPMCCB	Each	**8,393.00**	**8,393.00**	**8,393.00**	**8,393.00**
2.1.27.4	60A / 63A (16KA) TPMCCB	Each	**8,393.00**	**8,393.00**	**8,393.00**	**8,393.00**
2.1.27.5	80A (16KA) TPMCCB	Each	**8,479.00**	**8,479.00**	**8,479.00**	**8,479.00**
2.1.27.6	100A (16KA) TPMCCB	Each	**8,479.00**	**8,479.00**	**8,479.00**	**8,479.00**
2.1.27.7	125A (25KA) TPMCCB.....	Each	**9,939.00**	**9,939.00**	**9,939.00**	**9,939.00**

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna,Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
2.1.27.8	150/160A (25KA) TPMCCB	Each	**12,945.00**	**12,945.00**	**12,945.00**	**12,945.00**
2.1.27.9	200A (36KA) TPMCCB	Each	**21,105.00**	**21,105.00**	**21,105.00**	**21,105.00**
2.1.27.10	250A (36KA) TPMCCB	Each	**24,627.00**	**24,627.00**	**24,627.00**	**24,627.00**
2.1.27.11	300A / 320A (36KA) TPMCCB	Each	**47,303.00**	**47,303.00**	**47,303.00**	**47,303.00**
2.1.27.12	400A (36KA) TPMCCB	Each	**47,303.00**	**47,303.00**	**47,303.00**	**47,303.00**
2.1.27.13	500A (36KA) TPMCCB	Each	**51,597.00**	**51,597.00**	**51,597.00**	**51,597.00**
2.1.27.14	600A / 630A (36KA) TPMCCB	Each	**54,432.00**	**54,432.00**	**54,432.00**	**54,432.00**
2.1.27.15	800A (50KA) TPMCCB	Each	**74,789.00**	**74,789.00**	**74,789.00**	**74,789.00**
2.1.27.16	1000A (50KA)TPMCCB	Each	**97,121.00**	**97,121.00**	**97,121.00**	**97,121.00**
2.1.27.17	1000A (65KA) ACB	Each	**339,402.00**	**339,402.00**	**339,402.00**	**339,402.00**
2.1.27.18	1200A / 1250A (65KA) ACB	Each	**352,286.00**	**352,286.00**	**352,286.00**	**352,286.00**
2.1.27.19	1600A (65KA) ACB	Each	**399,527.00**	**399,527.00**	**399,527.00**	**399,527.00**
2.1.27.20	2000A (65KA) ACB	Each	**438,179.00**	**438,179.00**	**438,179.00**	**438,179.00**
2.1.27.21	2500A (65KA) ACB	Each	**532,662.00**	**532,662.00**	**532,662.00**	**532,662.00**
2.1.27.22	3000/3200A (65KA) ACB.....	Each	**661,502.00**	**661,502.00**	**661,502.00**	**661,502.00**

ANNEXURE-2.1

SPECIFICATION OF SUB-STATION EQUIPMENT

It shall be part & parcel of General and particular specification of standard tender document (STD)

GENERAL SPECIFICATION

The specification for the parts of this contract mentioned below cover design, manufacture, assembly and testing at the contractor's workshop as well as the supply, delivery, installation, testing and commissioning of the sub-station equipment at site.

CLIMATIC CONDITIONS

The climate is tropical and has marked Monsoon character with seasonal changes from humid, warm, rainy season, summers to cool and dry winters. Maximum temperature occurs during the period from April to May reaching approximately 43 °C (110 °F) with a relative air humidity of 60% to 70%.

The annual mean temperature is approximately 29 °C (84 °F). During the rainy monsoon month from June to September, the average relative air humidity is 80% and reaches extreme values up to saturation point during longer periods. the annual rainfall, most of which occurs from June to September is 2000mm to 2500mm.

OPERATING CONDITIONS

The sub-station equipment will be connected to the 11KV, 3-phase, 50 Hz Bus of Power Development Board (PDB) / REB / DPDC / DESCO & other power distribution companies of BANGLADESH.

STANDARDS

All equipment and materials must be in conformity with the most recent relevant Bangladeshi laws, standard rules and regulation. Particular attention is to be paid to the Electrical Act 1910 and Electricity Rules 1937 (as amended in 1946). All equipment and materials to be supplied, which required any form of approval by the BANGLADESH Government or a local authority like PDB / DPDC / DESCO / REB or equivalent must satisfactorily pass all inspection and tests procedures imposed by them.

Otherwise, all the equipment and materials must be in conformity with the most recent international rules, regulation, standards and recommendation : IEC

STANDARD DATA

The following standard values for high and low voltage are standard in BANGLADESH.

Distribution bus high voltage: 11KV, maximum system voltage 12 KV.

Low voltage : 415 / 240V local voltage
400 / 230-opening voltage
457V -Maximum permissible
Voltage by PDB / DPDC / DESCO / REB

FREQUENCY

The standard power frequency in BANGLADESH will be : 50Hz.

DESIGN & CONSTRUCTION REQUIREMENTS

All equipment are to be in accordance with the latest recognized rules of workmanship and modern engineering practice.
All parts of the equipment must be suitable in every respect for continuous operation at maximum output under the climatic conditions as specified above.

MARKING OF TERMINALS

The terminals shall be marked in accordance with BS, IEC, VDE or equivalent standards.

PAINTING

Protective painting shall be done in accordance with general practice and recognized methods, the paint manufacturer's instruction and according to the present addition of DIN 55 928, CORROSION PROTECTION OF STEEL STRUCTURE' such as to meet the tropical condition at site.

EARTHING OF EQUIPMENT

Each electrical equipment must be provided with an earthing screw of sufficient diameter or an earthing plate.

INSULATION CO-ORDINATION

The insulation level for load break switch, lightning arrestor and transformer are stipulated below, taking into account the maximum service voltage and the rated voltage according to IEC standard, with appropriate impose withstand test voltage and power frequency withstand test voltage values.

The insulation levels for equipment are as follows:
According to IEC rated service voltage : 11 KV
Maximum service voltage shall be considered : 12 KV
The respective test voltage shall be
Impulse withstand test voltage (BIL) : 75 KV
Power frequency withstand test voltage : 28 KV
For the lightning arrestor, the IEC standard voltage of 9KV is to be selected.

TECHNICAL REQUIREMENTS

The equipment specified in the following items shall withstand the impulse levels and test voltages specified by the recommendations of IEC, as stipulated before. They must be capable of carrying the short time current for thr.ee seconds and must withstand the short circuit (peak value) current.

The rupturing capacity of the circuit breakers is indicated in the respective items. The switchgear must be designed accordingly in order to withstand the mechanical short circuit stresses.

They must contain all technical particulars which are mentioned in the schedule of technical data.

The owner reserves the right to have routine tests carried out on each type of equipment at the manufacturer's workshop in the presence of his representative.

HIGH TENSION SWITCHGEAR

SCOPE

The switchgear shall be pre-fabricated, complete and ready for erection and suitable for indoor installation.

STANDARDS

11KV switchgear must comply with the requirements of IEC 694,VDE0101,0670 Part-6 74(draft), 0670 Part-7 74(draft) IEC republication 298.69 Pahls recommendation No.2 and equivalent British Standard (BS 116-1952) 11KV switch board shall be consisting of cubicles free standing type, for indoor installation, formed by pre-fabricated factory assembled. The individual cubicles shall be made of strong sheet steel (min16SWG) at all sides with iron angles and channels welded together.
The board shall be covered and the top shall be provided with pressure relief, flaps the bottom shall be open the allow connection of cables via and boxes, necessary holding iron and clamps are provided.

The front shall be provided with sheet steel doors with special locking devices and with viewing glasses in order to see the condition of the switches and the contact.
On the top of the cubicle sheet steel enclosed relay, meter cabinet shall be provided.

The iron and sheet steel parts after cleaning by modern methods shall be painted in the initial layers and a final paint as such the lacquer shall be a protection against corrosion the tropical humidity. The final color of the cubicles will be pebble grey to DIN 43656. The single bus bar system shall be of copper bars to withstand the required amperage. They are to be mounted on cast resin insulators in each cubicle.

The single bars shall be marked by the colors as per IEC, VDE or BS standard.

CIRCUIT BREAKER

The circuit breaker must comply with VDE specifications 0670, Part-102, IEC recommendations and publication 56, IEC 695, BS 116, BS 5311 or equivalent ANS & UTE specifications.

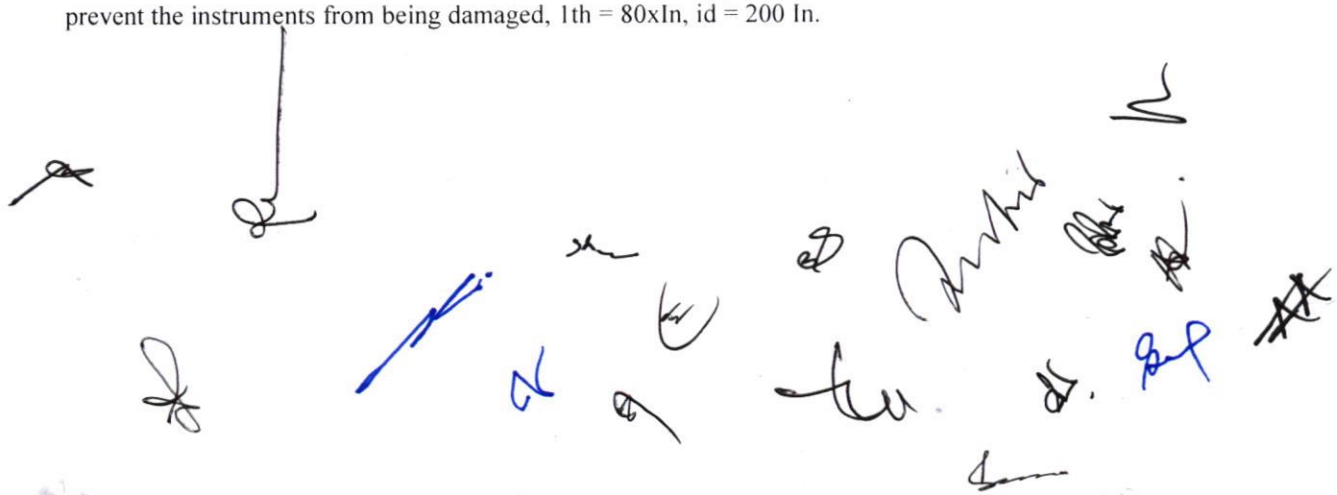
Technical data for circuit breaker

Nominal system voltage	: 11 KV
Rated normal current	: 630 A
Number of phases	: 3:00:00 AM
Frequency	: 50 HZ
Rated short circuit breaking current (rms)	: 25 KA
Rated short circuit making current duration	: 3 sec
Rates short circuit making current	: 50 KA
DC component of rated short circuit breaking current	: 36 %
Rated lightning impulse withstand voltage	: 75 KV
Rated power frequency withstand voltage (60 sec)	: 28 KV
No. of operation cycles at the rated normal current	: 20,000
No. of operation cycles at the rated short circuit current	: 100

CURRENT TRANSFORMER

Current transformer must comply with BS 3938, VDE 0414 and IEC 185.

The CT should be cast resin insulated with class 10P10 for protection and class 0.5 for metering. The rated over current factor and burden should be matching with operating burden of the connected equipment to prevent the instruments from being damaged, 1th = 80xIn, id = 200 In.



POTENTIAL TRANSFORMER

Potential transformer must comply IEC86,. The PT should be cast resin insulated with appropriate accuracy class and burden minimum 50VA. The PT secondary shall be protected with MCB.

IDMT RELAY

The relay for over current and earth fault protection should be of solid state (micro-computer operated) type. The complete triple pole, solid state IDMT relay with adjustable minimum setting for over current earth fault and short circuit protection including the A.C./D.C. converter.

This module can be housed in a standard case for assembling in cubicles. The socket which are located in either the rack or the case in which the module is plugged, should have one screw and one Snap-On terminal each for the plant connections. The heavy duty current plug connector should be provided automatic shorting of the CT circuits whenever the module is withdrawn. A make-before-break earth contact should be there to ensure protective earthing, before the other plug connections can be made. The relay should be suitable for D.C shunt tripping to be operated by 110V DC voltage from PT secondary through a rectifier or 12/24V DC through capacitor rectifier circuit.

Wiring inside the cubicles shall be minimum 1.5mm^2 area and with tinned copper conductors. Current circuits shall be made with minimum 2.5 mm^2 area and with tinned copper conductors.

All cubicles, frames, transformers, measuring and relay circuits shall have protective earthing. Each cubicle shall be provided with earthing bolt and earthing parts.

The bus bars shall be of copper and fully insulated through their length.

The protection system shall consist of over current protection and earth fault protection.

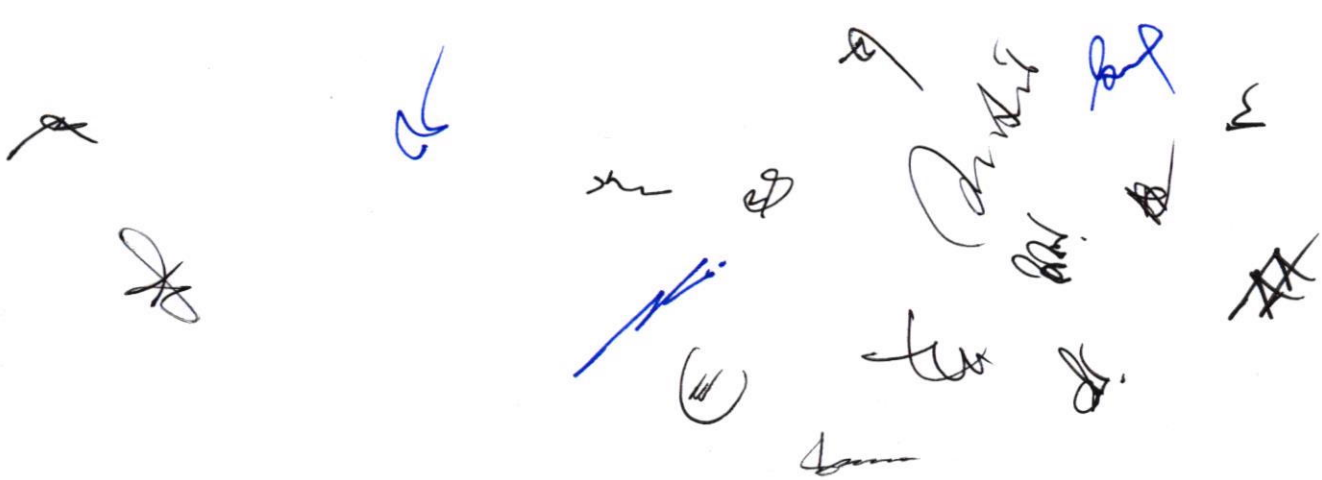
The bidder shall enclose details of system be proposes, along with single line diagram, detailed technical specification and mode of operation of protection system, with his offer

Complete physical dimensions and electrical characteristics of the equipment offered shall be furnished along with the offer.

GENERAL SPECIFICATION OF 11KV SWITCHGEAR

Nominal system voltage	KV	11
Highest voltage for equipment	KV	12
Type of switchgear	LBS/VCB/SF6	
Class of switchgear	Indoor Metal clad	
Number of phases	3	
Frequency (supply)	Hz	50
Bus bars	**Three Phase**	
Rated short circuit capacity		
a)Symmetrical breaking current	kAmps	25
b) Making current	kAmps	50
Short time current	kAmps	20
Short time current duration	Seconds	3
System neutral earthing	Effective	
Rated current		
a) Bus bars	Amperes	Min 800
b)Vacuum circuit breaker	Amperes	Min 630
Rated Insulation level		
a)Impulse withstand voltage to earth	KV	75
b) Impulse withstand voltage between phases	KV	75
c)Minimum dry Power frequency withstand voltage	KVrms	28

Voltage transformer		
a) Rated primary voltage	KV	11
b) Rated secondary voltage	V	110
c) Rated output / phase	VA	50
d)Accuracy class		0.5



THREE PHASE POWER TRANSFORMER

The transformer shall comply with IEC726, VDE 0532 etc. and the general specifications will be as follows:

Oil immersed indoor / outdoor type power transformer:

a)Rated capacity	: As per Schedule KVA
b)Rated frequency	: 50 Hz
c)Rated primary voltage	: 11 KV
d)Rated secondary voltage	: 0.415KV
e)Tap changing (off load)	: ± 2.5%, ± 5%, ± 7.5%
f)Phase connection	: DYN 11.
g)LV neutral	: Brought out
h)BIL level (HT side)	: 75KV (HT. side)
i)Maximum system voltage	: 12KV (HT. side), 0.5 KV (L.T. side)
j)Cooling	: As per schedule.

The tenderer shall furnish following data at 75 °C.

a)Iron loss at rated voltage and frequency

b) Copper loss (including supplementary eddy current loss) at continuous rated current (50 c/s) and for winding at 40 °C ambient temperature with the changer in middle position.

c) Impedance voltage with tap changer at middle position.

d)Voltage drop referred to rated voltage at rated load with tap changer in middle position and at unit p.f.

e) Permissible maximum symmetric thr.ee phase short circuit current referred to rated current.

f) Rated no load current (RMS value referred to rated current).

g) Type of windings with conductor materials.

h) Class of insulation material.

i) Voltage regulation.

j)Temperature after continuous rated loadat4 0°C ambient temperature. In windings core

k)one minute double power frequency induced tests voltage applied to:

HV line terminal

LV line terminal

LV Neutral.

l)Impulse test voltage 1.2/50 micro second fully wave positive and negative polarity applied to:

HV line terminal

LV line terminal

LV Neutral

weight of:

Iron core

Copper

The transformer shall be designed and manufactured in accordance with the requirement of B.S. 171: 1970 equivalent.

LOW TENSION SWITCHGEAR

The low tension switchgear shall be pre-wired, free standing and type conforming to IEC 439-1.

SWITCHGEAR DESIGN

The switchgear shall be pre-fabricated, complete and ready for erection on the site.

The switchgear shall be totally enclosed. All line parts shall be adequately and efficiently protected against accidental touching.

The switchgear cubicles shall conform to relevant provisions of BS / IEC and shall be adequate in all respect to accommodate the cables, switchgears, meters, cable terminations and inter connection as indicated in the schedule / specification / drawings and be with provided lockable doors. All apparatus and other components shall be easily accessible from the front as required for inspection, replacement and repair. The switch gear shall be of tropical design.

The switchgear shall conform to the specifications

Operating voltage	: 0.415 KV, 3-phase at 50 Hz.
Voltage system	:Direct earth
Number of bus bar	:5 (L1, L2, L3, N & E)
Rated current of bus bars	: As per schedule
Bus bar materials	: Copper
Degree of protection of bus bar chamber	: Enclosed
Maximum protective current	
(cos Q = 0.2, t=0.1 sec) of bus bar	: 80 KA
Maximum short time withstand current of bus bar	: 63 KA
Maximum protective peak current of bus bar	: 150 KA

All parts of the switchgear including apparatus shall be designed to withstand without being damaged, the mechanical and thermal, strain of this current or, where protected by circuit breaker, the interrupting current of the circuit breaker.

Outgoing cables shall be arranged in separate specious cable spaces.

Protective screens shall, as far as possible, be arranged between main bus bars and cable space.

Terminals for power cables shall be protected against accidental touching.

Interior control wiring shall be accommodated in plastic conduits.

Wiring inside the cubicles shall be made with minimum 0.75mm^2 area and with tinned copper conductors.

The Switchgear shall be suitable for bus bar entry from the top, if required as per schedule.

APPARATUS

The switchgear shall be arranged in accordance with the attached principle drawing.

The switchgear shall be of modular type design. The apparatus of each functional group shall be assembled on a common base.

Coils for contractors must be of open type to be repairable.

CUBICLE CONSTRUCTION

The distribution sections shall be of car case construction and the car case shall be augmented with various cladding plates as required.

The top plate, bottom plate and side plates shall be polled for easy removal.

The door shall be IP23 for distribution sections and IP54 for bottom plate respectively.

Creep age and clearance paths shall conform to VDE 0110 insulation group C or UL508 cable 18.1 and BS 162 table 4.

The electrical equipment inside the panel shall be finger proof. The cubical shall be dust vermin proof.

CABLE ENTRIES AND TERMINATIONS

The distribution board shall be so designed that the cable are fed in and connected in the base. The bottom plate shall be split and removable type to facilitate cable entry having cable grommet.

All cable socket for incoming and outgoing cable are to be provided.

CURRENT TRANSFORMERS

All current transformers shall comply with IEC 185 /BS 3938 and shall be of suitable class, rating and accuracy depending on the duty.

INDICATING LAMPS

Panels shall have indicating lamps as specified.

AIR-CIRCUIT BREAKERS / MCCB

The air-circuit breakers / MCCBs shall comply with IEC 947, 157 BS 4752.

The breaker shall have spring assisted manual closing mechanism with, breaker closing speed independent of operator. There shall be breaker closed opened position indicator manual tripping shall be by push button and it shall not be possible to trip the breaker by means of the closing mechanism. Over load release shall trip the breaker by means of the closing mechanism. Over load release shall trip the breaker on over current or short circuit. The time lag for these released and the current setting shall be adjustable.

CIRCUIT BREAKERS

The MCB / MCCB's shall be quick-make, quick-break, trip free, indicating type and shall have inverse time limit characteristics with adjustable overload, adjustable short circuit (the maximum adjustable limit should be as per schedule) and instantaneous magnetic trip elements functioning on overloads above the normal operating range. All circuit breakers shall be in accordance with schedule. All lugs must be of the solder less above the normal operating range. The MCB must comply with IEC 157-1, IEC 898 rated voltage 240/415V, A.C. 50 Hz. interrupting capacities minimum 6 KA current limiting class 3, finger proof, protection through thermal and magnetic trip sections respectively, temperature rating 40^0C preferably tropicalized (moisture fungus corrosion treated), with contacts of silver alloy, terminal capability as per requirement. The MCCB must comply with IEC 947, 157-1 having rated voltage 600V A.C. 50 Hz with thermal overload and instantaneous magnetic tripping action, temperature rating 40 °C preferably tropicalized (moisture-fungus-corrosion treated), terminal capability as per requirement. The bidder may offer MCCB instead of MCB to meet requirement of the specifications.

AUTOMATIC REACTIVE POWER CONTROL EQUIPMENT WITH CAPACITOR BANK

The power factor improvement plant shall be sheet steel clad dust and vermin proof free standing, floor mounting indoor type. The centrally controlled automatic PFI Plant will be of compact design and will be suitable for operation in 12 steps in the system for automatic control of the reactive power. The PFI plant shall be consisting of required capacity KVAR, 415V, 50 Hz, self-healing non-PCB, capacitor bank with disconnecting switch with fuses of proper rating, discharge resistors required nos. suitably rated air-breaker contractors and associated control unit. The contractors shall have special non-welding contacts which can control inrush current of up to 180 times the rated current. When the contractors drops out the resistors shall be switched on the capacitor by means of two break contact. The control unit shall be an integral part of the PFI Plant and will be comprised of CT of adequate rating automatic power factor correction relay to keep the automatic power indicating lamp ON / OFF switches, switching step indicator etc. PFI panel shall be of a type conforming to IEC 439-1 from manufacturer having ISO 9001. The automatic control must be non-responsive in a certain range to element hunting.

INSTALLATION

HT SWITCHGEAR & METERING PANEL

All standard checks of the equipment before installation shall be done by the contractor and unit shall be installed and tested as per direction of the manufacturer and consulting engineer. Required finishing work shall be done by the contractor and hooking up the unit with the system shall also be within this contract. Consumable materials required for complete installation of the equipment including cables compound, boxes etc. shall be supplied by the contractor. After complete installation be unit shall be tested by the contractor up to the satisfaction of the consultant and the Engineer-in-charge.

All accessories shall be installed as per direction of the Manufacturer and the Consultants. If the equipment is damaged during handling and installation. The Contractor must repair the damage or replace the damaged parts at his own cost.

TRANSFORMER

The Transformer equipment should be checked before installation by the contractor and installed and tested as per direction of the manufacturer and consulting engineers and the Engineer / consultant.
Required finishing work shall be done by the Contractor and hooking up the transformer with the system shall also be within this contract. Consumable materials required for complete installation including cable compound boxes etc. shall be supplied by the contractor and the rate quoted shall be inclusive of all incidental expenses. Care should be taken during carrying the transformer and its related parts. if there is any damage during handling and installation the Contractor will be liable to replace the damaged parts at his own expenses. After complete installation the transformer must be tested and commissioning as per direction of the Engineer / consultant, manufacturer and consultant.

LT SWITCHGEAR

All LT switchgear equipment must be installed on proper foundation. All consumables required for the complete work shall be supplied by the contractor. The work shall be complete with all internal electrical connections. After complete installation of the panel the contractor should test the complete LT switchgear equipment as per manufacturer specification and direction for full satisfaction of the consultant and the Engineer.

CAPACITOR

The item includes supervision of installation of capacitor on prepared foundation. The foundation is to be prepared by contractor as per direction of the Engineer / consultant. All consumables required to install the equipment shall be supplied by the contractor. After completion of the installation the contractor should test the equipment in presence of consultant to his satisfaction.

EARTHING SYSTEM

The work under this item shall consist of supply and installation of earth electrode with copper lead, earthing inspection pit and connecting to the specified terminal according to the drawing, specification and direction of the Engineer / consultant. The whole electrical system including light, fan, regulator sockets sub-station and metal parts incorporated with building electrification shall be earthed.
The earth resistance of the electrodes system shall be to the satisfaction of the local supply authority and shall not exceed in one ohms.

MATERIALS

Earth Electrode: The earth electrode in a 1 and 1/2" Dia., G.I. pipe with 3/16th inch. Dia. drilled holes.
The G.I. pipe shall be similar to the specification.
The pipe earth electrode shall be sunk and buried below ground level up to its full length or as advice by the Engineer / consultant. The earth lead and be connected to the earth electrode by brass/G.I. clamp. After making connection the clamp shall be covered with bitumen poured hot and with jute cloths.

Earth lead: Earth lead shall consist of two numbers, 2 SWG high conductive electrolytic bare copper wire meeting the requirement of B.S.S. 6360: 1969 and/or its equivalent.

All earth lead shall follow the shortest and most direct route to the earth electrode avoiding sharp bend and from inspection pit to the entry at the building shall be enclosed in 1" Dia.

G.I. pipe: The earth lead shall be connected to test earth electrodes by means of lugs, bolts, nuts and double washers to fix as to make permanent and positive connections both electrically and mechanically. The joints shall be covered with PVC compound without disrupting the continuity.

Earth inspection pit: Inspection pit shall have to be constructed over earth electrode to inspect and test the connection terminals. Bricks used shall be of 1st class and only approved quality cement shall be used, Jhama brick khoa for RCC cover shall be 3/4th inch downgraded and washed, cleaned before casting. 3/8th inch Dia. MS Rods @ 4" c/c with two 1/2" Dia. MS Hook shall be provided in the cover slab.

Installation

Lead: All earth lead shall follow the shortest a most direct route to the earth electrode avoiding sharp bend and from inspection pit to the earth electrode avoiding sharp bend and from inspection pit to the entry at the building shall be enclosed in 1" dia. water grade PVC pipe. The earth lead shall be connected test earth electrodes by means of lugs, bolts, nuts and double washers of failed as to make permanent and positive connections both electrically and mechanically. The joints shall be covered with PVC compound without disrupting the continuity.

Pit: 1st class brick made inspection pit and RCC cover with sub-station & diesel generator set hook shall be built on earth electrode as described here above at the location shown on the drawings the electrode shall be within 10'-0" from the building.

Maximum earth loop resistance: The maximum earth loop resistance any point in the installation including earth lead to the earth electrodes shall not exceed the resistance specified in the schedule or that indicated by the consultant. The contractor must ensure that the leads are efficiently bonded to all metal work other than the current carrying parts. So that the above resistance level is not exceeded. It will be the duty of the contractor to provide earth tester, test the installation in presence of the authorized representative of the authority and submit earth test report to the authority for approval.

Method of measurement: Measurement shall be set of earthing system installed.

INSPECTION & TESTING

INSULATION TESTS

Insulation resistance test shall be made on all electrical equipment, using a self-contained instrument such as the direct indicating ohm-meter of the generator type DC potential shall be used in these tests and shall be as follows:

Circuits under 230 volts : 500 volts

Circuits between 230 volts to 400 volts : 1000 volts

The minimum acceptable insulation resistance value is 5 mega ohms. Before making connections at the ends of each cable run, the insulation resistance measurement test of each cable shall be made. Each conductor of a multi-core cable shall be tested individually to all other conductors of the group and also to earth. If insulation resistance test readings are found to be less than the specified minimum in any conductor, the entire cable shall be replaced.

All transformers, switchgears etc. shall be subject to an insulation resistance measurement test to ground after installation but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches etc. and between each phase and earth.

INSPECTION OF SUBSTATION INSTALLATIONS

In substation installations, it shall be checked whether:

-The installation has been carried out in accordance with the approved drawings;

-Phase to phase and phase to earth clearances are provided as required;

-All equipment are efficiently earthed and properly connected to the required number of earth electrodes;

-The required ground clearance to live terminals is provided;

-Suitable fencing is provided with gate with lockable arrangements;

-The required number of caution boards, firefighting equipment, operating rods, rubber mats, etc., are kept in the substation;

-In case of indoor substation sufficient ventilation and draining arrangements are made;

-All cable trenches are provided with noninflammable covers;

-Free accessibility is provided for all equipment for normal operation;

-All name plates are fixed and the equipment are fully painted;

-All construction materials and temporary connections are removed;

-Oil level , bus bar tightness, transformer tap position, etc. are in order;

-Earth pipe troughs and cover slabs are provided for earth electrodes/earth pits and the neutral and LA earth pits are marked for easy identification;

-Earth electrodes are of GI pipes or CI pipes or copper plates. For earth connections, brass bolts and nuts with lead washers are provided in the pipes / plates;

-Earth pipe troughs and oil sumps/pits are free from rubbish, dirt and stone jelly and the earth connections are visible and easily accessible;

-HT and LT panels and switchgears are all vermin and damp-proof and all unused openings or holes are blocked properly;

-The earth bus bars have tight connections and corrosion free joint surfaces;

-Control switch fuses are provided at an accessible height from ground;

-Adequate headroom is available in the transformer room for easy topping-up of oil, maintenance, etc.;

-Safety devices, horizontal and vertical barriers, bus bar covers/surrounds, automatic safety shutters/door interlock, handle interlock etc. are safe and in reliable operation in all panels and cubicles;

-Clearances in the front, rear and sides of the main HT and LT and sub switch boards are adequate;

-The switches operate freely; the 3 blades make contact at the same time, the arcing horns contact in advance; and the handles are provided with locking arrangements,

-Insulators are free from cracks, and are clean;

-In transformers, there is no oil leak;

-Connections to bushing in transformers are light and maintain good contact;

-Bushings are free from cracks and are clean;

-Accessories of transformers like breathers, vent pipe, buchholz relay, etc. are in order;

-Connections to gas relay in transformers are in order;

-In transformers, oil and winding temperature are set for specific requirements to pump out;

-In case of cable cellars, adequate arrangements exist to pump off water that has entered due to seepage or other reasons; and

-All incoming and outgoing circuits of HT and LT panels are clearly and indelibly labeled for identifications.

- There should be minimum 80sq ft room for HT meter in the sub-station building with 4.5ft door (width) on the outside

-Separate ducting is required for electrical power cable and building communication such as: Internet, CCTV, fire alarm, public address system, PABX phones. There may be multiple ducts in multiple places for cable (for large buildings).For Optical fiber Cable communication- separate ducting is necessary.

TABLE 2.1 : SUB-STATION ROOM AREA
Area required for transformer room and substation for different capacities

Capacity of transformer (KVA)	Transformer room area (m^2)	Substation room area (with HT, LT panels & transformer room but without generator) (m^2)
1 x 150	12	45
1 x 250	13	48
2 x 250	26	100
1 x 400	13	48
2 x 400	30	100
3 x 400	40	135
2 x 630	26	100
3 x 630	40	190
2 x 1000	40	180
3 x 1000	45	220

Note :

1) Sub-station room height: The minimum height of a Substation room should be 3.0m to 3.6 m depending upon the size of a transformer.

2) Earth electrode: Copper rods. 12.7 mm Dia.
Copper plates. 600x600x6 mm
Galvanized iron pipes 50 mm Dia.

3) Sub-station equipment and generator shall not be installed in basement floor of any building. If necessary it may installed in first basement of multiple basement building or above the ground floor level (GFL) of the building special safety measures is to be taken by the user or owner. Measures are as follows:
(i) No objection certificate stating the Sub-Station safe by the Fire Service and Civil Defense Department.
(ii) Proper undertaking of the Sub-Station user or owner as the case may be, Stating safety and liability will be ensured by them.

4) A separate sub-station building is preferred for any project. Location of sub-station building shall be at load center of the complex.

5) Sub-station room shall have adequate ventilation system.