CHAPTER - X

Substation

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SECTION 10-1 SUBSTATION EQUIPMENT

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-1-1.	Providing, erecting, testing & commissioning approved make **oil immersed ONAN cooled , double wound , core type indoor / outdoor copper wound 11KV/ 433V step down transformer** of following capacities operating on 3 phase, 50 Hz 4 wire & neutral earthed system continuously rated for a full temperature rise in oil not exceeding 45 Deg.C.at maximum ambient temp. of 50 Deg. C. complete with necessary radiator first filling of new transformer oil & standard fitting as below complying with **IS 1180(Part 1):2014 standards with energy efficiency level 2**				
	Off load tap changing range steps **+2.5% to -5%** on H .V for variation should be provided. The H .V. shall be connected Delta & Secondary with star connection The transformer should have cable -end boxes on H.T. side suitable for up to 3 core 150 sq.mm. XLPE cable & on L .T. side suitable for bus duct or cables as per requirement complete with test certificates from manufacturers				
	1. Oil conservator with filling Hole & Cap - One No.				
	2. Thermometer pocket with 6" dial type thermometer switch alarm & trip contacts- Two nos.				
	3. Silica-gel breather with charge- One No.				
	4. Plain oil level gauge - One No.				
	5. Drain / Sampling / Filter valve- One No.				
	6. Top Filter Valve - One No.				
	7. Explosion vent with Diaphragm - One No.				
	8. Rating & Diagram plate - One No.				
	9. Additional neutral bushing for earthing - One No.				
	10. Bi directional Roller - Four Nos.				
	11. Earthing terminals - Two Nos.				
	12. Lifting lugs - Two Nos.				
	13. Air release plug. - One No.				
	14. Double float buchholz relay with Alarm and trip contacts.				
	15. Control cable as required from Transformer to VCB Panel is to be provided with necessary connection to VCB relays for protection.				
	as per IS 1180 level-2				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(a)250 KVA Max. allowable loses at 50 % of rated load is 0.98 KW and at full load is 2.93 KW				
	Cat.II	Ea.	412500.00	23719.00	436219.00
	Cat.III	Ea.	512500.00	23719.00	536219.00
	(b)315 KVA Max. allowable loses at 50 % of rated load is 1.025 KW and at full load is 3.1 KW		0.00	0.00	0.00
	Cat.II	Ea.	462500.00	31625.00	494125.00
	Cat.III	Ea.	600000.00	31625.00	631625.00
	(c) 500 KVA Max. allowable loses at 50 % of rated load is 1.510 KW and at full load is 4.3 KW				
	Cat.II	Ea.	706250.00	31625.00	737875.00
	Cat.III	Ea.	868750.00	31625.00	900375.00
	(d) 800 KVA Max. allowable loses at 50 % of rated load is 2.287 KW and at full load is 6.402KW				
	Cat.II	Ea.	868750.00	47438.00	916188.00
	Cat.III	Ea.	1062500.00	47438.00	1109938.00
	(e) 1000 KVA Max. allowable loses at 50 % of rated load is 2.79 KW and at full load is 7.77 KW				
	Cat.II	Ea.	1118750.00	47438.00	1166188.00
	Cat.III	Ea.	1462500.00	47438.00	1509938.00
	(f) 1250 KVA Max. allowable loses at 50 % of rated load is 3.3 KW and at full load is 9.20 KW				
	Cat.II	Ea.	1430000.00	70000.00	1500000.00
	Cat.III	Ea.	1880000.00	70000.00	1950000.00
	(f) 1600 KVA Max. allowable loses at 50 % of rated load is 4.20 KW and at full load is 11.80 KW				
	Cat.II	Ea.	1910000.00	90000.00	2000000.00
	Cat.III	Ea.	2310000.00	90000.00	2400000.00
10-1-2.	providing and erecting **sandwitched type bus duct** having following specification : Sandwich type busbar for use as Feeder Busbar for interconnection between separate electrical equipment/ load centers, and for use as Plug in busbar risers. The busbar shall be suitable for operation in a 690V / 1000 V system with frequency of 50 Hz .System can be either earthed or unearthed. Impulse voltage should be 12 KV. Standards:				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	The busbar shall be designed and manufactured in accordance with the following international standards for busbar trunking -IS 8623/ 1993 Part I & II : Particular requirements of busbar trunking System -IEC 61439 Part I & VI : Particular requirements of busbar trunking System -IEC- 60529 : Degree of protection TESTING The busbars shall be type tested at a reputable national / international test laboratory (ASTA or CPRI) for short circuit withstand. The test shall be for a minimum duration of one second. - Degree of ingress protection (IP rating) shall also be tested at any reputed independent laboratory. This test shall be for IP 55 for Indoor and IP 65 for Outdoor application. - Short circuit and Degree of protection type test reports will be submitted for vThe busbars shall be of high conductivity Copper of 99.9% pure ETP grade and high conductivity Aluminium of 99.59% pure 19501 grade. Where as earth conductor is required, it shall be separate external earth conductor, of high conductivity aluminium. Cross section of Earth Conductor shall be as per IEC 60439.				
	It should be possible to provide a 200% Neutral where specified. Phase cross over box should have busbars crossing over each other not cables. The busbars shall be individually insulated with 2 layers of insulating film. Layers of POLYSTER material class 'F', 155°C. The housing shall be made of 1.6 mm electrogalvanised sheet steel, with an epoxy powder coated paint finish of RAL 7032 grade. Alternatively Aluminum casing of 2.5mm may also be provided. The housings shall be profiled, to provide higher strength and efficient heat dissipation. The width of the housings shall be same for all ratings of busbars, in order to provide interchangeability of tap off boxes. The joints between sections shall be made so as to provide flexibility during installation and expansion / contraction of busbar during operation. The joints shall be of the single bolt type. The joint construction must have the following features. a) Thermal expansion of Busbars at joint of at least 4 mm per joint. b) The joint insulation must be of one piece moulded design and not have any cut edges which can absorb moisture. c) Joint assembly shall be removable as separate sub-assembly so that it can be inserted or removed without disturbing the adjacent sections. d) The joint system must be designed in a way that the installer cannot insert the busduct length too far and damage the bolt insulator. e) The busbars ends shall not have any holes or slots at the joints – the electrical continuity shall be through pressure plates, achieving a high area of joint cross section and expansion capability.				
	Tap of Units a) Plug in boxes will be draw out type, contacts shall be silver plated and spring loaded. b) The front operating handle will be interlocked with the plug-in boxes cover so that MCCB can be operated only with suitable cover in close position. c) The door shall be provided with the door knobs. d) When the MCCB is in "ON" position, even with the door knobs unlocked, the operator should not be able to remove the box or open the tap off location cover. e) During insertion, the earth conductor shall make contact first before the phase conductors. This should follow the sequence of first in last out concept. f) When the box is open the live conductors shall be safe guarded by a transparent insulator plate which allows for visible inspection but does not allow touching of the live conductors. g) The tap off unit arrangement must achieve IP 54 without requiring any additional sealing at site. h) The tap off boxes will be suitable for accommodating MCCBs or other accessories, as required. The tap off units should allow the flexibility of accommodating different, reputed MCCB makes, to be mutually agreed depending on the tender requirements.				
	(A) Aluminium Bus				
	(a)400 Amp. capacity	Mtr.	8100.00	900.00	9000.00
	(b)630 Amp. capacity	Mtr.	9000.00	900.00	9900.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(c)800 Amp. capacity	Mtr.	11000.00	1000.00	12000.00
	(d)1000 Amp. capacity	Mtr.	11500.00	1500.00	13000.00
	(e)1250 Amp. capacity	Mtr.	13500.00	1500.00	15000.00
	(f)1600 Amp. capacity	Mtr.	16500.00	1500.00	18000.00
	(g)2000 Amp. capacity	Mtr.	20000.00	2000.00	22000.00
	(h)2500 Amp capacity	Mtr.	26000.00	2000.00	28000.00
	(i)3200 Amp capacity	Mtr.	29500.00	2500.00	32000.00
	(j)4000 Amp. capacity	Mtr.	33500.00	2500.00	36000.00
	(k)5000 Amp. capacity	Mtr.	42500.00	2500.00	45000.00
	(B) Copper Bus				
	(a)630 Amp. capacity	Mtr.	21100.00	900.00	22000.00
	(b)800 Amp. capacity	Mtr.	23000.00	1000.00	24000.00
	(c)1000 Amp. capacity	Mtr.	26500.00	1500.00	28000.00
	(d)1250 Amp.. capacity	Mtr.	30500.00	1500.00	32000.00
	(e)1600 Amp. capacity	Mtr.	38500.00	1500.00	40000.00
10-1-3.	Providing, installing & commissioning & getting Plan Approval as well as NOC from Electrical Inspector for **draw out type 11 KV Indoor extensible type totally enclosed, single busher floor mounting metal clad 400A. vacuum tube circuit breaker** confirming to IS: 2516 (Part- I &11, Sec.1) 'for use on 11 KV, 3 phase, 50 c/s. unearthed A.C. supply system having breaking / rupturing capacity of 350 MVA complete with spring operated mechanism, mechanically ON-OFF and spring mechanism charged, discharged indicators, ON-OFF mechanical push button, operation counters necessary auxiliary switches, closing shunt trip, air insulated busbar chamber having heat shrinkable PVC sleeves, mechanical interlocks safety shutters, isolating plugs and a VCB trolley with three vacuum interrupters with epoxy support insulators and self aligning finger type isolating contacts. The breaker shall be Manual cum motorised mechanism with following accessories	Nos	537300.00	20700.00	558000.00
	1. 144 mm. square flush mounting type digital multifunctional meter with communication facility				
	2. Power Factor Meter One No				
	3. Double core current transformer cast resin type having ratio 200 to 50/1 core for metering & second core for protection having required class of accuracy.				
	4. Instantaneous under voltage relay - & Temperature rise Tripping Relay				
	5. Electrical closing coil & short trip coil operating on 110V. D.C.-				
	6. Auxiliary relay for anti pumping device				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	7. Three phase Three limb Drawout type feeder connected & output of 200 VA cast resin insulated potential transformer having ratio 12000V./110V. and 200 VA Burdon with 0.5 accuracy.				
	8. Common Alarm bell operating on 110V A.C.- One No.				
	9. KWH Meter - One No.				
	10. Cable boxes suitable up to 11 KV 3core 150 sq.mm XLPE cable.				
	11. 230V. A.C. to 110V. D.C. power pack for closing & tripping circuit common.. (for each VCB)				
	12.Breaker ON-OFF, Auto trip and spring charged indicators				
	13.Phase indicating & panel illumination lamps with plug socket				
	14.Numerical Communicable type non directional O/C & E/F Relay with a setting of 5-250% both in O/C & E/F.				
	complete with necessary interconnection with air insulated high grade copper busbar (ABB/ Siemens / Jyoti) [10-1-4]{Breaker Testing scope include Closing Time, Opening Time, VCB Hi-Pot test at Site}{ Relay Testing Scope Include testing of all protection by three phase testing kit at site }(VCB Trolley is to be provided)				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-1-4.	Providing, erecting, testing commissioning & getting Plan Approval as well as NOC from Electrical Inspector for extensible H.T panel comprising of **one 400A. H.T. VCB Incoming & Two outgoing 400 A Drawout type VCB** confirming as per I.S. for use on 11 KV, 3 phase, 50 c/s. unearthed A.C. supply system having breaking rupturing capacity of 350 MVA complete with spring operated mechanism, mechanically & automatic ON-OFF and spring mechanism charged, discharged indicators, ON-OFF mechanical push button, operation counter necessary auxiliary switches, closing shunt trip, air insulated busbar chamber having heat shrinkable PVC sleeves, mechanical interlocks safety shutters, isolating plugs and a VCB trolley with three vacuum interrupters with epoxy support insulators and self aligning finger type isolating contacts. The breaker shall be Manual cum motorised mechanism & auto spring charge with TNC switch closing with following accessories.	Ea.	1526050.00	26450.00	1552500.00
	1. 144 mm. square flush mounting type digital multifunctional meter with communication facility - Three sets.				
	2. Power Factor Meter One No				
	3. Double core current transformer cast resin type having ratio 200 to 50/1 core for metering & second core for protection having required class of accuracy. - Three Sets				
	4. Instantaneous under voltage relay& Temperature rise Tripping Relay				
	5. Electrical closing coil & short trip coil operating on 110V. D.C.- Three Sets				
	6. Auxiliary relay for anti pumping device				
	7 Three phase Three limb Drawout type feeder connected & output of 200 VA cast resin insulated potential transformer having ratio 12000V./110V. and 200 VA Burdon with 0.5 accuracy. - One No.				
	8. Common Alarm bell operating on 110V A.C.- One No.				
	9. KWH Meter - One No.				
	10. Cable boxes suitable up to 11 KV 3core 150 sq.mm XLPE cable. - Three Nos.				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	11. 230V. A.C. to 110V. D.C. power pack for closing & tripping circuit common.				
	12.Breaker ON-OFF, Auto trip and spring charged indicators. - Three Sets.				
	13.Phase indicating & panel illumination lamps with plug socket - Three Sets.				
	14.Numerical Communicable type non directional O/C & E/F Relay with a setting of 5-250% both in O/C & E/F. - Three Set				
	complete with necessary interconnection with air insulated high grade copper busbar (ABB/ Siemens / Jyoti) (Breaker Testing scope include Closing Time, Opening Time, VCB Hi-Pot test at Site){ Relay Testing Scope Include testing of all protection by three phase testing kit at site)(VCB Trolley is to be provided)				
10-1-5.	Supplying, installing, testing approved make Resin Vacuum Impregnated Dry Type, AN Naturally Cooled Double wound core type, suitable for Indoor / Outdoor Installation, Copper Wound 11/ 0.433 kV Step Down Transformer of following capacities operating on 3 phase,50Hz, 4wire and neutral earthed system. H.V. shall be connected Delta and Secondary with star connection having vector group Dyn-11.Continuously rated for a Temperature Rise in winding not exceeding 90 degree at maximum ambient temperature of 50 degree with F Class Insulation and 115 degree with H Class insulation respectively whichever is required. Following standard fitting as per applicable BIS 11171 & BIS 2026 with Off Circuit Links in steps of + /- 5%,+ /-2.5%'on H.V. side for H.V. variation should be provided. The Transformer should have Cable end Boxes on H.T. side Suitable for 3 Core, 150Sq.mm. XLPE cable on L.T. side suitable for Busduct or Cable Box as per requirement. Enclosure shall be painted with enamel paint shade 632 as per I.S.(Crompton/Kirloskar / Alsthom / Voltamp make)				
	1. 1No. Winding Temperature Indicator with Alarm and Trip Contacts.				
	2. Rating and Diagram Plate				
	3. Off Circuit Tapping Links for + /-5%H.V. variation in steps, in steps of 2.5%				
	4. 2 Nos, Earthing Terminals .				
	5. Base Channel with Hauling Holes.				
	6. Lifting lugs for Transformer				
	7. Enclosure with suitable arrangement to accept H.V. L.V. Cables / Busduct				
	8. Ventilation grid.				
	9. Warning Plate				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	10.Junction Box for Winding Temperature Indicator.				
	11. Ventilation Louvers				
	12. Flat Rollers				
	13. Lifting lugs as applicable				
	14.Primary and Secondary Un-drilled Gland Plates./15. H.V. & L.V. and Neutral Terminal				
	(A) 315 KVA, 11/0.433 kV	Ea.	548550.00	26450.00	575000.00
	(B) 500 KVA, 11/0.433kV	Ea.	806440.00	33060.00	839500.00
	(C) 750 KVA, 11 /0.433 kV	Ea.	990440.00	33060.00	1023500.00
	SECTION 10-2				
10-2-1.	Providing and fixing printed **instruction chart** both in English and Gujarati and duly framed with front glasses, for treatment of person suffering from Electric shock with minimum 50" diagonally size.	Ea.	144.00	6.00	150.00
10-2-2.	Providing **pair of rubber hand gloves** suitable for working on 11 KV/22 KV supply.	Ea.	250.00	0.00	250.00
10-2-3	Supplying **rubber matting** of following thickness as per IS:15652/IEC 61111				
	(a)3mm	Sq.Mtr	900.00	0.00	900.00
	(b)4mm	Sq.Mtr	1200.00	0.00	1200.00
	(c)12mm	Sq.Mtr	3600.00	0.00	3600.00
10-2-4	Supplying stand **first AID box** with antiseptic cream, medicine for use on wounds due burn, crepe bandage, gauge bandage, medicated ready to use bandage (Band-aid) adhesive tape for medicinal user, Scissors, anti-septic solution (Savlon or similar) etc. (All above contents shall be of standard makes)	Ea.	350.00	0.00	350.00
10-2-5	Supplying **FIRE bucket round bottom of 9 litres capacity** made out of 24 gauge G.I. sheet with extra handle at bottom duly painted white inside and Red out side with FIRE mark, filled with dry-sand and kept on existing stand provided or hung on wall hook.	Ea.	250.00	0.00	250.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-2-6	Supplying and erecting **floor mounting stand** for keeping four nos. of FIRE buckets comprising 1500 mm in length, 900 mm height frame made out of 30mm X30 mm X 4 mm angle iron with cross supports for legs, welded with 4 hooks and duly painted with one coat of red lead and two coats of approved enamelled silver paint.	Ea.	1050.00	50.00	1100.00
10-2-7	**Wall hook** 22 to 25 cms. projection for keeping fire buckets made out of 15 mm dia. M.S rod grouted in wall to a depth of minimum 15 cms.	Ea.	47.00	23.00	70.00
10-2-8	**Transformer oil** having good resistance to high electrical stress, high di-electric strength (50KV) low viscosity, low pour point, high flash point and excellent thermal properties for efficient heat transfer and cooling as per I.S.335 -1972.	Ltr.	85.00	0.00	85.00
10-2-9	**Filtration of transformer oil** as per I.S. for removal of moisture, carbon. slurry etc.by means of circulating oil through vacuum pump from heating elements and filters to with stand the breaking strength of the oil above 40KV beyond one minute tested in oil testing Kit.				
	(A) on site.	Ltr.	0.00	9.00	9.00
	(B) at factory.	Ltr.	0.00	7.00	7.00
10-2-10	Providing, and erecting **11 KV D.P. 9 mtr. high Structure** made of 6" x 3" 'I'-Section Girder, 4" x 2"channels, clamps, nuts, bolts etc. Suitable for erection of the followings duly connected with necessary ACSR conductors. as per drawing approved by the Engineer- in charge complete with following. Height as per IS 7 Mtr above ground)				
	(A) 11 KV 200 Amps Drop out fuses with S.R.B.P. tubes carries.-Three nos				
	(B) 11 KV G.O.D. switch complete with insulators, operating handle with galvanised pipe, Sq.bar etc. 400 Amp.- One Set				
	(C) 11 KV lightening arrestor with clamp- Three Nos.				
	(D) 11 KV shackle insulators- Six Nos.				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(E) The above D.P. structure should be earthed with 25 mm.X 3 mm thick double copper earth strips run separately and connected with separate copper plate earth electrode.	Ea.	105000.00	10000.00	115000.00
10-2-11	Providing and erecting ISI Marked **3core 50 Sq.mm XLPE** insulated 11 KV armoured cable Aluminium conductor IS-7098 to be laid on wall with clamps or in provided cable trench / pipe in approved manner as directed.	Mtr	1345.00	30.00	1375.00
10-2-12	Providing and erecting ISI Marked **3core 70 Sq.mm XLPE insulated 11 KV armoured cable Aluminium conductor** IS-7098 to be laid on wall with clamps or in provided cable trench / pipe approved manner as directed.	Mtr	1530.00	30.00	1560.00
10-2-13	Providing and erecting ISI Marked **3 core 95 Sq.mm XLPE insulated 11 KV armoured cable Aluminium conductor** IS-7098 to be laid on wall with clamps or in provided cable trench / pipe approved manner as directed.	Mtr	1550.00	50.00	1600.00
10-2-14	Providing and erecting ISI Marked **3core 120 Sq.mm XLPE insulated 11 KV armoured cable Aluminium conductor** IS-7098 to be laid on wall with clamps or in provided cable trench / pipe approved manner as directed.	Mtr	1735.00	65.00	1800.00
10-2-15	Providing and erecting ISI Marked **3core 150 Sq.mm XLPE insulated 11 KV armoured cable Aluminium conductor** IS-7098 to be laid on wall with clamps or in provided cable trench / pipe approved manner as directed.	Mtr	2050.00	75.00	2125.00
10-2-16	Providing and erecting ISI Marked **3core 185 Sq.mm XLPE insulated 11 KV armoured cable Aluminium conductor** IS-7098 to be laid on wall with clamps or in provided cable trench / pipe approved manner as directed.	Mtr	2200.00	90.00	2290.00
10-2-17	Providing and erecting **cable end termination kit,** heat shrinkable Push on type Densons'/ 'Raychem'/ Elastimold make suitable for 11 KV XLPE cable **3 core 50 & 70 Sq.mm**				
	(A) Outdoor type	Ea.	14310.00	690.00	15000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(B) Indoor type	Ea.	7130.00	690.00	7820.00
10-2-18	Providing and erecting cable end termination kit, heat shrinkable Push on type Densons/ Raychem/ Elastimold make suitable for 11 KV XLPE cable **3core 95 & 120 Sq.mm**				
	(A) Outdoor type	Ea.	16320.00	750.00	17070.00
	(B) Indoor type	Ea.	8600.00	750.00	9350.00
10-2-19	Supplying and erecting, high tension **cable end box indoor type suitable for 11 KV 3core H.T cable up to 50 Sq.mm** complete with gland, bushing and jointing material.	Ea.	1380.00	920.00	2300.00
10-2-20	Supplying and erecting high tension **cable end box outdoor type suitable. for 11 KV 70Sq.mm 3core H.T. cable** complete with gland bushing and jointing material.	Ea.	2070.00	1150.00	3220.00
10-2-21	Supplying and erecting high tension **cable end box outdoor type suitable. for 11 KV 95 / 120Sq.mm 3core H.T. cable** complete with gland bushing and jointing material.	Ea.	2600.00	1200.00	3800.00
10-2-22	Supplying and erecting high tension **cable end box outdoor type suitable. for 11 KV 150/185Sq.mm 3core H.T. cable** complete with gland bushing and jointing material.	Ea.	3100.00	1400.00	4500.00
10-2-23	Supplying & erecting **D.C.P. type fire extinguisher** for following capacity cartridge type with gun metal cap 150 gram CO2 gas cartridge, powder and brackets confirming to IS 2171 1985 and complete erected with necessary clamps made from 50 x 6 mm M S Flat with nuts and bolts grouted in wall complete.				
	[A] For 5 Kg Capacity	Ea	1970.00	30.00	2000.00
	[B] For 10 KG Capacity	Ea	2570.00	30.00	2600.00
10-2-24	Supplying & erecting carbon dioxide (CO2) fire extinguisher user of following capacity with necessary clamps made from 50 x 6 mm M.S. Flat with nut & bolts grouted in wall complete.				
	[A] For 4.5 Kg Capacity	Ea	7670.00	30.00	7700.00
	[B] For 5.5 / 6.5 KG Capacity	Ea	10100.00	30.00	10130.00
10-2-25	Supplying & erecting **ABC powder type 'Ceasefire' type Fire extinguisher** as per IS 13849 or 1 Kg capacity with necessary clamp for erection on wall	Ea	960.00	30.00	990.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	SECTION 10-3 **SUBSTATION MAINTENANCE**				
10-3-1.	**Carryout routine maintenance, servicing and testing of 400 Amps. H.T. OCB / VCB** in accordance with I.S. 10119-1962 part I-to-IV with below defined scope: (1) Cleaning of dust,spider web ,foreign particles. Etc . (2) Removal of old grease with new grease for various parts.(3) Cleaning of various parts with CRC.(4) Check the tightness of all hardware (5)Checking of Spring Charging, Closing & Tripping mechanism (11) Measurement of IRV (12) Measuring of closing/tripping time by time testing kit (13) Measuring contact resistance by CRM kit.	Job	0.00	2750.00	2750.00
10-3-2.	**Carry out routine maintenance and servicing and testing up to 6300 Amp L.T. ACB** with below defined scope: (1) Cleaning of dust,spider web ,foreign particles. Etc . (2) Removal of old grease with new grease for various parts.(3) Cleaning of various parts with CRC.(4) Check the tightness of all hardware (5)Checking of Spring Charging, Closing & Tripping mechanism (11) Measurement of IRV (12) Measuring of closing/tripping time by time testing kit (13) Measuring contact resistance by CRM kit.(14) Release testing by OEM recommended testing kit.	Job	0.00	2145.00	2145.00
10-3-3.	**Carryout routine maintenance and servicing of L.T. cubical panel** board having approximately 15 to 22 Nos. of switches cleaning and servicing the contacts with CRC, tighting the connections of incoming and outgoing cables. and hacking the operating mechanism for smooth functioning of switches. and putting them in smooth working order.	Job	0.00	2500.00	2500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-3-3(A)	**Servicing, overhauling, cleaning of the panel board LT by liquid EPNF-065™ technology** , after scanning the single side of panel by thermal scanning technology. Thermal scanning technology includes measuring temperature before and after servicing by each & every space of the panel board. One side of panel must be cleaned by Air Compressor Capacity 2.5 to 3.5 HP Motor, 1 or 3 phase, 230v, Air tank having capacity approx 50 kg with latest moisture filter, spray gun having EPNF-065™ liquid. The work having time constraints of 2 to 5 minutes single side of the panel. After finishing work agency has to provide 3 photographs or to provide 2 minutes video. Dust or any waste material must be collected by agency in the bottom of panel board by non woven fabrics material or any scientific materiel. Agency has to carry out work in presence of site in charge engineer & to complete the work as per site in charge engineer. (Consider Measurement MIN. Sq.Mtr.) Scope Of Work :- a) liquid Cleaning, b) blowing by compressor & Cleaning, c) Thermal Scanning, d) Photograph & Videos e) Supervision by authorized Engineer	Sq.Mtr.	2418.10	3262.90	5681.00
10-3-3(B)	**Servicing, overhauling, cleaning of the panel board HT by EPNF-065™ technology** , after scanning the single side of panel by thermal scanning technology. Thermal scanning technology includes measuring temperature before and after servicing by each & every space of the panel board. One side of panel must be cleaned by Air Compressor Capacity 2.5 to 3.5 HP Motor, 1 or 3 phase, 230v, Air tank having capacity approx 50 kg with latest moisture filter, spray gun having EPNF-065™ liquid. The work having time constraints of 2 to 5 minutes single side of the panel. After finishing work agency has to provide 3 photographs or to provide 2 minutes video. Dust or any waste material must be collected by agency in the bottom of panel board by non woven fabrics material or any scientific materiel. Agency has to carry out work in presence of site in charge engineer & to complete the work as per site in charge engineer. (Consider Measurement MIN. Sq.Mtr.) Scope Of Work :- a) liquid Cleaning, b) blowing by compressor & Cleaning, c) Thermal Scanning. d) Photograph & Videos e) Supervision by authorized Engineer	Sq.Mtr.	3128.10	3531.90	6660.00
10-3-4.	Carrying out the **testing of earth fault and overload relay** by authorized person ,on L.T. side. by removing the fault of relay by checking the trip devices, control wiring and putting the same in working order with test report	Job	0.00	2500.00	2500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-3-5.	Testing and calibration of **relay series coils of H.T.O.C.B** through primary Injection up to 3000 AMP (3 coils sets)	Job	0.00	2500.00	2500.00
10-3-6.	**Routine maintenance of Transformer** in operating covering Insulation Resistance oil breakdown strength, reconditioning /replacement of silica gel, cleaning of transformer & topping up to of oil if required .(Oil will be provided departmentally or at extra cost.)	Job	0.00	3000.00	3000.00
10-3-7.	**Testing of transformer oil by calibrated instrument for dielectric breakdown strength** with test report	Job	0.00	500.00	500.00
10-3-8.	**Measurement of earthing resistance by loop test with authorized test report** after isolating & cleaning joint.	Per Earth Pit	0.00	500.00	500.00
10-3-9.	**Dismantling and refitting** of transformer including cost of required new M.S. bolts of following capacity transformer				
	(A) 250 KVA	Ea.	569.00	1869.00	2438.00
	(B) 315 KVA	Ea.	569.00	1869.00	2438.00
	(C) 500 KVA	Ea.	469.00	2156.00	2625.00
	(D) 630 KVA	Ea.	394.00	2731.00	3125.00
	(E)1000/1250 KVA	Ea.	531.00	3594.00	4125.00
	(F) 1600 KVA	Ea.	688.00	4313.00	5001.00
10-3-10.	Replacing old and unserviceable **gasket of Top cover plate** of Transformer having following capacity.				
	(A) 250 KVA	Ea.	446.00	73.00	519.00
	(B)315 KVA	Ea.	446.00	73.00	519.00
	(C)500 KVA	Ea.	603.00	73.00	676.00
	(D)750 KVA	Ea.	903.00	73.00	976.00
	(E)1000/1250 KVA	Ea.	1190.00	73.00	1263.00
	(F)1600 KVA	Ea.	3053.00	73.00	3126.00
10-3-11.	Replacing old & unserviceable **gasket bushing of H.T.** for the following capacity Transformer				
	(A)250 KVA	Ea.	231.00	44.00	275.00
	(B)315 KVA	Ea.	256.00	44.00	300.00
	(C)500 KVA	Ea.	306.00	44.00	350.00
	(D)750 KVA	Ea.	331.00	44.00	375.00
	(E)1000/1250 KVA	Ea.	369.00	44.00	413.00
	(F)1600 KVA	Ea.	394.00	44.00	438.00
10-3-12.	Replacing old & unserviceable **gasket bushing of L.T.** for the following capacity Transformer				
	(A)250 KVA	Ea.	156.00	44.00	200.00
	(B)315 KVA	Ea.	156.00	44.00	200.00
	(C)500 KVA	Ea.	206.00	44.00	250.00
	(D)750 KVA	Ea.	238.00	44.00	282.00
	(E)1000/1250 KVA	Ea.	294.00	44.00	338.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(F)1600 KVA	Ea.	306.00	44.00	350.00
10-3-13.	Removing the **laminated core plate** of the following capacity Transformer.				
	(A)250 KVA	Ea.	0.00	1563.00	1563.00
	(B)315 KVA	Ea.	0.00	1875.00	1875.00
	(C)500 KVA	Ea.	0.00	1875.00	1875.00
	(D)750 KVA	Ea.	0.00	2500.00	2500.00
	(E)1000/1250 KVA	Ea.	0.00	3125.00	3125.00
	(F)1600 KVA	Ea.	0.00	3375.00	3375.00
10-3-14.	Removing washer ring for the coils of the following capacity Transformer		0.00	0.00	0.00
	(A)250 KVA	Ea.	73.00	15.00	88.00
	(B)315 KVA	Ea.	85.00	15.00	100.00
	(C)500 KVA	Ea.	135.00	15.00	150.00
	(D)750 KVA	Ea.	148.00	15.00	163.00
	(E)1000/1250 KVA	Ea.	160.00	15.00	175.00
	(F)1600 KVA	Ea.	235.00	15.00	250.00
10-3-15.	Replacing the burnt unserviceable **H.T. side winding coils** for the transformer including rewinding, varnishing, vacuuming etc.				
	(A) For Copper Coils	Kg.	528.00	73.00	601.00
	(B)For Aluminium coils	Kg.	253.00	73.00	326.00
10-3-16.	Replacing the burnt / unserviceable **L.T side winding coils** for transformer including rewinding, varnishing, vacuuming etc.				
	(A) For Copper Coils	Kg.	478.00	73.00	551.00
	(B)For Aluminium Coils	Kg.	228.00	73.00	301.00
10-3-17.	**Insulating the HT/LT copper Aluminium coils** of transformer.	Kg.	185.00	35.00	220.00
10-3-18.	**Re insulating the HT / LT Copper / Alum. Coils** of the following capacity transformer				
	(A)250 KVA	Kg.	42.00	58.00	100.00
	(B)315 KVA	Kg.	42.00	58.00	100.00
	(C)500 KVA	Kg.	72.00	58.00	130.00
	(D)750 KVA	Kg.	82.00	58.00	140.00
	(E)1000 KVA	Kg.	92.00	58.00	150.00
	(F)1250 KVA	Kg.	99.00	58.00	157.00
	(F)1600 KVA	Kg.	107.00	58.00	165.00
10-3-19.	**Inside painting of 250/ 315 / 500 / 750 / 1000 /1250 KVA** transformer.	Ea.	1527.00	173.00	1700.00
10-3-20.	**Outside painting** of Transformer for the following capacity				
	(A) 250 / 315 / 500 KVA	Ea.	1620.00	230.00	1850.00
	(B) 750 / 1000/1250 KVA	Ea.	1827.00	173.00	2000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-3-21.	Replacing the **valve of the Transformer** of rating capacity 250 / 315 / 500 / 750 / 1000 /1250 KVA of following size				
	(A) 3/4"	Ea.	301.00	36.00	337.00
	(B) 1"	Ea.	664.00	36.00	700.00
	(C) 1.1/4"	Ea.	483.00	36.00	519.00
	(D) 1.1/2"	Ea.	539.00	36.00	575.00
10-3-22.	Replacing the **oil level glass** of the 250/315/500/750/1000/ 1250 KVA by new one	Ea.	84.00	29.00	113.00
10-3-23.	Replacing the **breather** of the Transformer of following capacity.				
	(A) 250 KVA / 315 KVA	Ea.	1400.00	100.00	1500.00
	(B) 500 KVA/750 KVA/1000 /1250 KVA	Ea.	1800.00	200.00	2000.00
10-3-24.	Repairing of **off load Tap changer** of 250 / 315 / 500 / 750 / 1000 /1250 KVA Transformer.	Ea.	1170.00	230.00	1400.00
10-3-25.	Replacement of **off load Tap changer** of 250 KVA / 315 / 500 / 750/1000/1250 KVA Transformer	Ea.	3470.00	230.00	3700.00
10-3-26.	Replacing **H.T. bushing** of 250 / 315 / 500 / 750 / 1000 /1250 KVA transformer by new one.	Ea.	253.00	29.00	282.00
10-3-27.	Replacing **H.T Bushing metal parts** of 250 KVA / 315 / 500 / 750 / 1000 /1250 KVA Transformer by new one.	Ea.	351.00	36.00	387.00
10-3-28.	Replacing **H.T. bushing all other parts** of 250 KVA / 315 / 500 / 750 / 1000 /1250 KVA Transformer.	Ea.	189.00	36.00	225.00
10-3-29.	Replacing **L.T. bushing** of following capacity Transformer				
	(A) 250 KVA / 315 KVA	Ea.	77.00	23.00	100.00
	(B) 500 / 750 / 1000/1250 KVA	Ea.	107.00	23.00	130.00
10-3-30.	Replacing **L.T.Bushing metal parts** of 250 / 315 / 500 / 750 / 1000 /1250 KVA Transformer.	Ea.	494.00	44.00	538.00
10-3-31.	Replacing **L.T.Bushing all / other parts** of the 250 / 315 / 500 / 750 / 1000 KVA /1250 kva transformer.	Ea.	706.00	44.00	750.00
10-3-32.	**Drying the repaired transformer** with appropriate heat air of following capacity transformer.				
	(A) 250 KVA / 315 KVA	Ea.	0.00	2150.00	2150.00
	(B) 500 KVA	Ea.	0.00	2250.00	2250.00
	(C) 750 KVA	Ea.	0.00	2500.00	2500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(D) 1000 KVA	Ea.	0.00	2700.00	2700.00
	(E) 1250 KVA	Ea.	0.00	3000.00	3000.00
10-3-33.	**Carrying out various routine test as per instruction of in charge** for following capacity transformer.				
	(A) 250 KVA / 315 KVA	Ea.	0.00	1750.00	1750.00
	(B) 500 KVA / 750 KVA/ 1000 KVA/1250 KVA	Ea.	0.00	3000.00	3000.00
10-3-34.	**Assembling the repaired / replace copper Aluminium coils** of the following capacity transformer				
	(A) 250 KVA / 315 KVA / 500 KVA	Ea.	0.00	2200.00	2200.00
	(B)750 KVA/ 1000 KVA/1250 KVA	Ea.	0.00	2300.00	2300.00
10-3-35.	**Conveyance charges** including loading / unloading for transformer from workshop to site or back. one side)				
	(I) Local up to 10 Km	Ea.	0.00	450.00	450.00
	(ii) Outside Divisional Head Quarter for first 30 Km from store.	Ea.	0.00	500.00	500.00
	(iii)Add for each block of additional 30 Km	Ea.	0.00	250.00	250.00
10-3-36.	**Loading/Unloading transformer** on one side				
	(A) 250 KVA / 315/500 KVA	Ea.	0.00	3600.00	3600.00
	(B) 750/1000 KVA/1250 KVA	Ea.	0.00	5900.00	5900.00
10-3-37.	**Supplying & fixing Steel Chequered Plate** having **7 mm** thickness, duly painted with two coats of black Japan colour. (Average Wt 61.1 kg / Sq.Mtr)	Sq.Mtr.	3909.00	216.00	4125.00
10-3-38.	Supplying & fixing **Steel Chequered Plate having 10 mm thickness,** with handle duly painted with two coats of black Japan colour. (Average Wt 84.6 kg / Sq.Mtr)	Sq.Mtr.	5159.00	216.00	5375.00
10-3-39.	Supplying & fixing **Steel Chequered Plate having 12 mm thickness**, duly painted with two coats of black Japan colour. (Average Wt 200.3 kg / Sq.Mtr)	Sq. Mtr.	6463.00	288.00	6751.00
10-3-40.	Supplying & Fixing **SMC Chequered plate having 7 mm thickness,** made out of SMC Confirming to IS 13410 & by Hot press Compression Moulding technique Suitable cut & fixed with MS Angle Frame to Fit Trench Widths as per site requirement approved by engineer incharge	Sq. Mtr.	4000	240	4240

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-3-41.	Supplying & Fixing **SMC Chequered plate having 10 mm thickness,** made out of SMC Confirming to IS 13410 & by Hot press Compression Moulding technique Suitable cut & fixed with MS Angle Frame to Fit Trench Widths as per site requirement approved by engineer incharge	Sq. Mtr.	5000	300	5300
10-3-42.	Supplying & Fixing **SMC Chequered plate having 12 mm thickness,** made out of SMC Confirming to IS 13410 & by Hot press Compression Moulding technique Suitable cut & fixed with MS Angle Frame to Fit Trench Widths as per site requirement approved by engineer incharge	Sq. Mtr.	6500	390	6890
	10-4 Generating Sets				
10-4-1	Supplying **portable generator set** with petrol start and kerosene run engine confirming to IS: 4722:1968 & BS:5514 ,4 stroke, single cylinder, 179 C.C., TCI ignition system, centrifugal governor, air cooled, semi dry type air cleaner and recoil starter, noise suppressor, oil alert system, with brushless, self exciting, two pole, rotating field type "E" class insulation alternator suitable to give 1400 VA output at 220 +/-13 Volts A.C. with rated current of 6.4 Amps with built in voltmeter, non fuse circuit breaker along with one set of tool kit comprising of one spanner, screw driver, spark plug opener complete duly tested at full load for continuous 2 hour with first filling of oil and fuel. Generator Set of following capacity				
	(A) 1400 VA output at 220 +/- 13 Volts A.C.	Each	39500.00	0.00	39500.00
	(B) 2000 VA output at 220 +/- 13 Volts A.C.	Each	49000.00	0.00	49000.00
	NOTE:- Add Rs 2600/- for Diesel Start / Run for above				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-4-2	Supplying and erecting, commissioning and testing of **Diesel Generating set** confirming to IS: 4722:1968 & BS:5514 having continuous rating, 3 phase, 415 volts, 50 cycles A.C. supply comprising of a totally enclosed air/water cooled diesel engine with multi-cylinders developing suitable BHP not less than following capacity at 1500 RPM with 10% overload for one hour in 24 hours with standard accessories like fly wheel, lubricating oil cooler, "A" class governor, heavy duty fuel wheel and lubricating oil filter, oil bath air filler, lubricating oil pressure gauge, end exhaust manifold, standard set of tools with adjustable spanners, screw drivers, cylinder head to cover, joint cylinder head to exhaust, element lube oil filter, 12 / 24 volts electric starting equipment complete with standard heavy duty battery, dynamo, cut-outs, ammeter, necessary wiring, pressure gauge, starter etc and heavy duty Residential type exhaust silencer and vertical hot air duct both				
	logged with asbestos rope, save oil trays, exhaust piping of required length, standard wall/floor mounted fuel with level indicator and piping and drip proof alternator, self excited, self regulated, screen protected, with excitation system, capable of delivering the rated system output at 415 volts, 3 phase, 0.8 PF, 50 Hz, 4 wire, running at 1500 RPM, conforming to IS-4722- 1968 with voltage regulation +/- 5% of rated voltage from no load to full load. Both the engine and alternator fitted on a common fabricated steel base plate with antivibration mounting engine and alternator both connected to each other by flexible flange coupling and with floor/wall mounted control panel box comprising of voltmeter ammeter, selector switches, ACB / MCCB / MCB of adequate capacity.				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	indicator lamps duly wired with HRC fuses. The alternator & control panel shall be connected with provided suitable capacity armoured cable and complete with Acoustic enclosure (canopy) made out of 16 SWG CRCA Sheet, sound absorbing material Rockwool of 64 density & 100 mm thick conforming to IS:8183 / PU Foam of 40 Density - at least 40 mm. The resin bonded rockwool covered from inside the canopy by perforated sheet with 3/4 mm holes, sound level not more than 75 dB at a distance of 1 mtr, as per PVCT norms. Erection, commissioning and satisfactory testing as per requirement with first filling of fuel, oil, etc. with guarantee / Warrantee of complete system for Two years. & with obtaining all necessary certificate from Electrical Inspector. The Capacity and Ratings of DG sets are as below.				
(A)	Continuous Rating of 10 KVA ,BHP not less than 15 BHP	Each	263250.00	2150.00	265400.00
(B)	Continuous Rating of 15 KVA ,BHP not less than 20 BHP	Each	314798.00	2202.00	317000.00
(C)	Continuous Rating of 20 KVA ,BHP not less than 26 BHP	Each	332413.00	2202.00	334615.00
(D)	Continuous Rating of 25 KVA ,BHP not less than 32 BHP	Each	383392.00	2553.00	385945.00
(E)	Continuous Rating of 30 KVA ,BHP not less than 42 BHP	Each	438447.00	2553.00	441000.00
(F)	Continuous Rating of 40 KVA ,BHP not less than 52 BHP	Each	476896.00	2904.00	479800.00
(F) 2	Continuous Rating of 45 KVA ,BHP not less than 52 BHP	Each	496896.00	2904.00	499800.00
(G)	Continuous Rating of 50 KVA ,BHP not less than 65.8 BHP	Each	609296.00	2904.00	612200.00
(H)	Continuous Rating of 62.5 KVA ,BHP not less than 76 BHP	Each	628794.00	3606.00	632400.00
(I)	Continuous rating of 75 KVA ,BHP not less than 91 BHP	Each	669894.00	4106.00	674000.00
(J)	Continuous rating of 82.5 KVA ,BHP not less than 102 BHP	Each	690794.00	4106.00	694900.00
(K)	Continuous rating of 100 KVA ,BHP not less than 126 BHP	Each	901092.00	4808.00	905900.00
(L)	Continuous rating of 125 KVA ,BHP not less than 154 BHP	Each	958092.00	4808.00	962900.00
(M)	Continuous rating of 140 KVA ,BHP not less than 166 BHP	Each	1212992.00	4808.00	1217800.00
(N)	Continuous rating of 160 KVA ,BHP not less than 197 BHP	Each	1300692.00	5808.00	1306500.00
(O)	Continuous rating of 180 KVA ,BHP not less than 235 BHP	Each	1388488.00	7212.00	1395700.00
(P)	Continuous rating of 200 KVA ,BHP not less than 254 BHP	Each	1480388.00	7212.00	1487600.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
(Q)	Continuous rating of 250 KVA ,BHP not less than 309 BHP	Each	1834184.00	8616.00	1842800.00
(R)	Continuous rating of 320 KVA ,BHP not less than 375 BHP	Each	2459000.00	11551.00	2470551.00
(S)	Continuous rating of 380 KVA ,BHP not less than 445 BHP	Each	2679000.00	12584.00	2691584.00
(T)	Continuous rating of 400 KVA ,BHP not less than 480 BHP	Each	2780000.00	12980.00	2792980.00
(U)	Continuous rating of 500 KVA ,BHP not less than 600 BHP	Each	3780000.00	16450.00	3796450.00
	AMF panel				
10-4-3	Providing & erecting approved make **AMF control panel** suitable for following size of 3 phase, 415 V., 50 cycles, A.C. diesel generating set complete of scope as detailed below: 1) Power module: A pair of electromechanically interlocked contactors (for mains & generator) Overload relay for generator contactor Neutral contactor for mains and generator Power socket for connections. 2) Control and metering module: Line voltage monitor. Generator voltage monitor Ammeter 3 items attempt start facility. Air circuit breakers/MCB/MCCB of suitable rating for auto/manual operation. Auto/manual switch. Emergency stop push buttons. Manual start push button. frequency meter. Engine hour meter. Two earthing studs.				
	3) Protection module: The engine shutdown in the unlikely event of Low lube oil pressure High cylinder head temperature. V belt failure. 4) Indicators with alarm Load on generator. 5) Indicators Load on mains Engine fails to start . Emergency stop battery charger. The AMF Panel of following capacity				
(A)	AMF Control Panel for 50/62.5 KVA 3 phase DG Set	Each	111700.00	2000.00	113700.00
(B)	AMF Control Panel for75 KVA/82.5 KVA3 phase DG Set	Each	127400.00	2000.00	129400.00
(C)	AMF Control Panel for100 KVA/125 KVA3 phase DG Set	Each	139600.00	2000.00	141600.00
(D)	AMF Control Panel for200 KVA/250 KVA3 phase DG Set	Each	256200.00	4000.00	260200.00
(E)	AMF Control Panel for 300 KVA/320 KVA3 phase DG Set	Each	327560.00	5000.00	332560.00
(F)	AMF Control Panel for 380 KVA/ 400 KVA3 phase DG Set	Each	408750.00	6000.00	414750.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
(G)	AMF Control Panel for 500 KVA 3 phase DG Set	Each	510937.00	7000.00	517937.00
10-4-3	Providing & erecting approved make ATS panel suitable for following size of 3 phase, 415 V., 50 cycles, A.C. diesel generating set complete of scope as detailed below: 1) Power module: Motorised Changeover switch with ATS controller, Auxiliary contactor with NO & NC contacts with Automatic Battery Charger, indicating lamps for Generator ON, Mains ON, Load and suitable control terminals and power terminals with neutral earthing studs.				
(A)	ATS Panel for 15/20 / 25 KVA 3 phase DG Set	Each	45000.00	2000.00	47000.00
(B)	ATS Panel for 30 KVA/40 / 45 KVA 3 phase DG Set	Each	55000.00	2000.00	57000.00
(C)	ATS Panel for 50 / 62.5 KVA 3 phase DG Set	Each	65000.00	2000.00	67000.00
(D)	ATS Panel for 75 KVA/82.5 KVA3 phase DG Set	Each	70000.00	4000.00	74000.00
(E)	ATS Panel for 100/ 125 KVA 3 phase DG Set	Each	80000.00	5000.00	85000.00
(F)	ATS Panel for 160 KVA 3 phase DG Set	Each	90000.00	6000.00	96000.00
(G)	ATS Panel for 180 / 250 KVA 3 phase DG Set	Each	100000.00	7000.00	107000.00
(H)	ATS Panel for 320 KVA/ 380 / 400 /500 KVA3 ph DG Set	Each	200000.00	10000.00	210000.00
	Acoustic enclosure (canopy)				
10-4-4	Supplying and erecting **Acoustic enclosure (canopy)** made out of 18 SWG, CRCA Sheet, sound absorbing material Rockwool of 64 density & 100 mm thick conforming to IS:8183 The resin bonded Rockwool / PU FOAM covered from inside level not more than 75 dB at a distance of 1 mtr, as PVCT norms , on provided foundation suitable for following size of DG Set. The enclosures for following capacity of DG sets.				
(A)	For 10/15/20/25 KVAD.G. set	Each	104485.00	1500.00	105985.00
(B)	For 30 KVA/45 KVA	Each	132335.00	1500.00	133835.00
(C	For 50 KVA/62.5 KVA	Each	153200.00	1500.00	154700.00
(D)	For for 75 KVA to 82.5 KVA, 100/125/140 KVA	Each	222800.00	2000.00	224800.00
(E)	For for 160/180/200/250 KVA	Each	306400.00	3000.00	309400.00
(F)	For 320 kVA	Each	366000.00	4000.00	370000.00
(G)	For 380 kVA / 400 kVA	Each	410000.00	5000.00	415000.00
(H)	For 500 kVA	Each	460000.00	6000.00	466000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	compact substation				
10-04-5.	Supply of 250 KVA Outdoor type **Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a) Transformer**: 250 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F , with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec . 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment :** one no. MCCB of 400A, 36kA, 4Pole, Microprocessor based release with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be by appropriate Aluminium PVC sleeved Busbar	Each	1125000.00	125000.00	1250000.00
10-4-6.	Supply of 315 KVA Outdoor type **Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a) Transformer**: 315 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F , with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec . 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment :** one no. MCCB of 500A, 36kA, 4Pole, Microprocessor based release with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be by appropriate Aluminium PVC sleeved Busbar	Each	1170000.00	130000.00	1300000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-4-7.	Supply of 400 KVA Outdoor type **Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a) Transformer**: 400 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F , with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of Incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment** : one no. MCCB of 630A, 36kA, 4Pole, Microprocessor based release with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be by appropriate rating Aluminium PVC sleeved Busbar	Each	1278000.00	142000.00	1420000.00
10-4-8.	Supply of **500 KVA Outdoor type Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a)** Transformer: 500 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F , with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of Incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment : one no. ACB of 800A, 50kA, 4Pole, Microprocessor based release** with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be appropriate rating Aluminium PVC sleeved Busbar	Each	1485000.00	165000.00	1650000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-4-10.	Supply of **750 KVA Outdoor type Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a) Transformer**: 750 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F, with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec . 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment** : one no. ACB of 1250A, 50kA, 4Pole, Microprocessor based release with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be appropriate rating Aluminium PVC sleeved Busbar	Each	1737000.00	193000.00	1930000.00
10-4-11.	Supply of **1000 KVA Outdoor type Compact Substation** consisting of Transformer,HT switchgear and LT Switchgear and confirming to IEC-62227. **a) Transformer**: 1000 KVA Copper wound 11KV /433 V DYn11, Dry Cast resin type Transformer with tapping range +10 to -10% @ 2.5% (with tolerance), class F , with surge restorers, Digital WTI, IS1171 as per **b) HT Compartment**: 11KV, 21kA for 3 Sec . 630 A 50 Hz, gas insulated VCB in SS tank in sheet enclosure having provision for one no. direct connection of incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5, mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection **c) LV side compartment** : one no. **ACB** of 1600A, 50kA, 4Pole, Microprocessor based release with arrangement for bottom cable termination (100% for phase & 50% for N, Current density - 1A/ sq mm) The enclosure should be of IK10 type.The Enclosure shall construction shall be GI of thickness at least 1.6/2mm.The enclosure shall be Powder Coated. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment will have IP-34 ingress protection, whereas the HT/LT compartment will have IP-54 protection.The connection between HT and Transformer shall be by 3 runs of single core 95 sq mm XLPE aluminium cable and between Transformer to LT switchgear shall be appropriate rating Aluminium PVC sleeved Busbar	Each	1993500.00	221500.00	2215000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-4-16.	SITC of **SF6 gas insulated Single VCB**: Sheet steel enclosed, free standing, Outdoor mounted, 11 kV, 630A, 21kA/3s, 1 WAY Non - extensible SF6 gas insulated VCB, consisting of One no. direct connection of Incoming supply cable upto 300sq mm and one no. VCB(Manually charging & closing) in series with LBS between VCB and Transformer, Self Powered Relay 3 O/C +1 E/F Relay type CSPR-V5 , mechanical ON/OFF indicator, trip coil , Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, cable boots, 3 nos. CTs with Ratio -/1A, Cl: 5P10, 2.5 VA for protection	Each	180000.00	20000.00	200000.00
10-4-17.	Providing & erecting **capacitor duty contactor** 3 phase, 415 V with proper connection for following rating:				
	i) 10 KVAR	Each	1912.50	212.50	2125.00
	i) 15 KVAR	Each	2686.50	298.50	2985.00
	i) 20 KVAR	Each	3073.50	341.50	3415.00
	i) 25 KVAR	Each	3415.50	379.50	3795.00
	i)50 KVAR	Each	9679.50	1075.50	10755.00
10-4-17(A	**Design, Supplying, installing, testing of factory fabricated ready made Three phase APFC Panel Cubical Panel** fabrication should be type tested as per IEC 61921, 61439:1&2 Capacitor Duty Contactor for switching as per following Steps Incomer Switch of MCCB type Icu=Ics=50KA at 400/440 Volts, with Microprocessor based OC, SC, internal earth fault protection Incomer Switch of MCCB type Icu=Ics=50KA at 400/440 Volts, with Microprocessor based OC, SC, internal earth fault protection,Copper tinned insulated Busbar,Cubical panel should be indoor type with IP 43 and IK 10,Metalized polypropylene film tye3-phase 550Volt Capacitor,De tuning Reactor for each capacitor,Panel having Short Circuit and Overload protection,Each step Capacitor having suitable MCCB with Sc, OL, internal earth fault relay,Each stage having Stage Contactor (Capacitor load rating),PF regulator master controller having suitable steps with LCD display, Rs 485 Communication port, Indication LED Lamps for main incomer and ON-OFF for each capacitor bank,MS Chanel for Floor mounting. Cable entry as per site situation,Cooling fans for panel				
	(A)50KVAR (10KVAR X 4 Nos and 5KVAR X 2 Nos Steps)	Each	160000	7000	167000
	(B)75KVAR (25KVAR X 2 Nos and 10KVAR X 2 Nos, 5KVAR X 1 Nos. Steps)	Each	245000	10000	255000
	(C)100KVAR (25KVAR X 2 Nos and 10KVAR X 4 Nos , 5KVAR X 2 Nos. Steps)	Each	325000	12500	337500
	(D)125KVAR (25KVAR X 2 Nos and 10KVAR X 6 Nos , 5KVAR X 3 Nos. Steps)	Each	400000	18000	418000

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(E)150KVAR (25KVAR X 3 Nos and 10KVAR X 4 Nos , 6KVAR X 3 Nos. Steps)	Each	485000	21000	506000
	(f)200KVAR (50KVAR X 2 Nos and 25KVAR X 3, 10KVAR X 2Nos, 5KVAR X 1 Nos. Steps)	Each	650000	28000	678000
	(g)250KVAR (50KVAR X 3 Nos and 25KVAR X 4, 10KVAR X 2Nos, 5KVAR X 1 Nos. Steps)	Each	800000	40000	840000
	LIGHTENING ARRESTER				
10-5-1	SITC of **Vertical Air Termination Solid aluminium** with Base- 10 mm dia and 1000 mm long. Air Termination Base tested for conditioning, Ageing Test & Lightning impulse current withstand test: 100 kA of 10/350µs waveform in an accredited Third party laboratory as per 6.3 & 6.4 of IEC 62561-1 2017 protocol with MAST 34mm dia 3000 mm long- Cold Galvanized	Each	10500.00	500.00	11000.00
10-5-2	SITC of **8 mm dia solid Aluminium Conductor for roof top mesh grid** and tested as per IEC 62561-2 conducted in the Govt. accredited thirty party laboratory to meet the requirement of IS/IEC 62305 with Required Accessories - Aluminium Holding clamp at every 1 mtr distance, Aluminium/SS cross splicer at every crossing of Alu. conductor, Expansion piece with connectors at every 20 mtr distance, Aluminium straight Splicer to connect conductors. All Accessories should be tested as per IEC 62561-1 2018 Cl. 6.3 for conditioning & Ageing Test & 6.4 for Lightning impulse current withstand test: 100 kA of 10/350µs waveform(Ageing & Electrical test) conducted in a sequence manner & tested in the Govt. accredited Third party laboratory to meet the requirements of IS/IEC 6230	Mtr	330.00	20.00	350.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
10-5-3	SITC of **10 mm MS Round Solid Conductor having smooth surface** Should be tested and use exclusively for lightning protection (Vertical Riser/Down Conductor which shall be concealed in Column) to meet the requirement of IS IEC 62305 With Accessories - Earthing stud of dimension SS-75mm OD plate with 10mm dia tail connector used in structural steel ring earthing system to meet the requirements of IS/IEC 62305. (For Interconnecting the Column and the Terrace AL Conductor / Strip/Flat). SS Cross Connector to connect Earth fixing point to vertical raiser/Down conductor, SS Straight Splicer at every 4 Mtr to connect MS conductor in column. Bonding /Rebar Clamp at every 3 mtr suitable for interconnecting round conductor with reinforcement inside the concrete for structural earthing system, SS connector -To connect external conductor 8- 10 mm with earth fixing point. All Accessories should be tested as per IEC 62561 1 2018 Cl. 6.3 for conditioning & Ageing Test & 6.4 for Lightning impulse current withstand test: 100 kA of 10/350µs waveform(Ageing & Electrical test) conducted in a sequence manner & tested in the Govt. accredited Third party laboratory to meet the requirements of IS/IEC 6230	Mtr	830.00	20.00	850.00
10-5-4	SITC of **Galvanized Steel Flat 25x6 mm thickness** from earth electrode directly in ground as required. Zinc coating: 500 g/m square (Approx:70 micron coating) tested and used exclusively for lightning protection earthing system and ring equipotential bonding.	Mtr	160.00	20.00	180.00
10-5-5	SITC of **14.2 mm dia 3 mtr long Earth electrode** of High tensile steel electrode with 250 micron copper bonding & 1 bag of Carbon fill Based environment friendly backfill tested as per IEC 62561-7 in NABL accredited Laboratory and suitable stainless Steel double sided clamp. Eco Friendly rust proof heavy duty weather proof Polyethylene Earth Pit Chamber with following dimensions :254 mm dia (top), 330 mm dia (bottom) & 260 mm (height).	Per Set	6500.00	500.00	7000.00
	ENERGY AUDIT & SAFETY AUDIT				
10-5-6	Carrying out **energy audit** by BEE energy accredited energy auditor/firm for the entire electrical /mechanical system/equipment /installation consuming energy by measurement of various parameters to measure present energy consumption and providing energy auditor detail report with necessary suggestions for improvement with safety report with payback period per kva of contract demand.	per kva	0.00	750.00	750.00

CHAPTER - XI

Temporary illumination, A/C, Public address audio/ video & standby power system

CHAPTER-XI TEMPORARY ILLUMINATION,A/C,PUBLIC ADDRESS AUDIO/ VIDEO & STANDBY POWER SYSTEM	
(Rates included GST/Service Tax)	
NOTES	
1	The rates for temporary D.G,sound ,E.I. ,A.C. , LED, TV, Multi media are applicable for 1st day including preparatory & testing period & no additional amount shall be paid for that but for rehearsal if ask by authority, additional amount shall be paid 25% of first day rental charges.
2	(i) For the second day of function , 40% of first day rent shall be considered. (ii) For each additional day after Second day of function but not exceeding 15 days, 15% of first day rental cost will be considered.
3	After 15 days 5% of 1st day rental cost will be limited do 80% of full rate of newly purchased equipments .For more than above days,it is necessary to have consent letter of administrative authority.
4	Testing of all temporary arrangement will be positively given before 12 hours start of function or rehearsal (if ask by concerned Authority) .
5	For D.G. set, rental rates are applicable for first day. (1)For next subsequently 7 days ,90% of first day rental charges will be applied (2)from 8th day ,80% of the 1st day rental charges shall be applied and no additional amount will be paid for preparation & testing periods except rehearsal if required.
6	The above rates are for the function with on load working of DG set up to 5 hours per day and if the DG set is to be used continuously on load mote 5 hours per day then for each 5 KVA of DG set add Rs 60.00 per hour operation to be paid extra.
7	Necessary certificate from electrical inspector will be taken by concern Agency before 4 hours starting from function / rehearsal positively .
8	The rate for DG Set included transportation charges for up to 30 kms from Concern Division H.Q. to function place and back. Add Rs . 500/- for additional 30 kms. Block.
9	The items which are not included in SOR the higher charges should be derived as 10% of total cost of item for 1 st day.
10	All switchgears,cables,wires, fittings & Lamps with accessories etc must be ISI MARKED Positively.
11	Rates is inclusive of material, labour, supervision, liaison, transportation -overheads and All taxes including GSTexcept 1% labour cess.

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-1	Hire charges for providing erecting temp **LED light 10 mm bulbs approved** high glow with complete wiring with auto changer reverse and after good use dismantling.				
	(A) Strip Light. (Minimum 38 Lamps / Mtr.)	1st Day /RMT	0.00	21.00	21.00
	(B) Series Light. (Minimum 5 Lamps / Mtr.)	1st Day /RMT	0.00	3.00	3.00
	(C) Rope Light. (Minimum 15 Lamps. / Mtr.)	1st Day /RMT	0.00	7.00	7.00
	(D) Decorative LED design light on board	1st Day /lamp	0.00	1.00	1.00
	(E) Decorative LED palm piece	1st Day /piece	0.00	250.00	250.00
11-1-2	Hire charges for providing erecting and dismantling temporary illumination, consisting of **strip lights complete with holders, bulbs up to 40Watt lamp** of different colours complete with necessary lead wires erected and dismantled.	1st Day / No	0.00	3.00	3.00
11-1-3-a	Hire charges for providing erecting and dismantling temporary illumination consisting of the **LED tube lights 22 watt minimum** complete withlead wires	1st Day / No	0.00	20.00	20.00
11-1-3-b	For use of **decorative tube** in place of simple tube	1st Day	0.00	13.00	13.00
11-1-4	Hire charges for providing erecting and dismantling temporary illumination consisting of **flood light fitting up to 100 Watt** complete with holders lead wires, **incandescent lamp** with different colours with indoor / outdoor type	1st Day /Nos	0.00	17.00	17.00
11-1-5	Hire charges for providing erecting and dismantling temporary illumination consisting of **halogen fitting 500 Watt / 85 watt retrofit CFL lamp/60watt LED lamp** with suitable size Al. reflector complete with holders tube and lead wires. (outdoor Type)	1st Day /Nos	0.00	60.00	60.00
11-1-6-b	Hire charges for providing erecting and dismantling temporary illumination consisting of halogen fitting 1000 Watt complete with holders tube and lead wires. (Outdoor Type)	1st Day /Nos	0.00	80.00	80.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-7	Hire Charges for heavy duty flood light luminaire comprises die cast aluminium body with heat resistant toughened front glass, silicon rubber gasket, electromechanically brightened anodised aluminium reflector , hot deep galvanized M.S. cradle clamp with suitable size of necessary control gear box having choke, capacitor, holder, lamp etc. complete.				
	(A) Suitable for One No. 70 watt HPSV / Metal helide lamp	1 St.Day./ no	0.00	193.00	193.00
	(B)Suitable for One No. 150 watt HPSV / Metal helide lamp	1 St.Day./ no	0.00	270.00	270.00
	(C)Suitable for One No. 250 watt HPSV / Metal helide lamp	1 St.Day./ no	0.00	300.00	300.00
	(D)Suitable for One No. 400 watt HPSV / Metal helide lamp	1 St.Day./ no	0.00	483.00	483.00
11-1-8	Hire charges for providing erecting and dismantling after use of good running condition for the **HPSV street light** fitting with necessary accessories and lamps with fixing arrangement as per direction of engineer incharge				
	(a) suitable for 70 watt	1 St.Day./ no	0.00	115.00	115.00
	(b) suitable for 150 watt	1 St.Day./ no	0.00	138.00	138.00
	(b) suitable for 250 watt	1 St.Day./ no	0.00	174.00	174.00
	(b) suitable for 400 watt	1 St.Day./ no	0.00	269.00	269.00
11-1-9	Providing and fixing **chaser** to give running erected to strip light and min up to load of 5 KW	1 St.Day./ no	0.00	176.00	176.00
11-1-10	Hire charges for providing, erecting and dismantling after use in good running condition for temp. arrangement of **city colour HMI light** with necessary KW capacity Lamps with its control panel and wiring and operating complete.				
	(a) 2 / 2.50 Kw.	1 St.Day./ no	0.00	10450.00	10450.00
	(a) 4.0 Kw.	1 St.Day./ no	0.00	17050.00	17050.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-11	Hire charges for providing, erecting as per direction of Engineer in charge and dismantling after use in good running condition with providing temp illumination by **CYBER / SCANNER lights of 1200 watt rotating mechanism** controlled by microprocessor base pre programmed controllers with suitable data control. and power cables and connections.	1 St.Day./ no	0.00	8250.00	8250.00
11-1-12	Hire charges for providing, erecting & dismantling **Sharpy Moving Head light 200-440 w 20R(Beam,Spot,Wash)3-in-1 hybrid** with necessary wiring & controller as required and as per instruction of engineer-incharge	1 St.Day./ no	0.00	7500.00	7500.00
11-1-13	Hire charges for providing & dismantling temp. **three light consisting Neon / LED Light with electronically controlled effects(Par light)** complete erected with necessary supports with connection & necessary controller .				
11-1-13-A	(a) 50 to 150 Watt	1st. Day Per No.		1200.00	1200.00
11-1-13-B	(b) above 150 Watt	1st. Day Per No.		1800.00	1800.00
11-1-14-A	Hire charges for providing erecting and dismantling after use of good running condition **1200 mm / 1400 mm size ceiling fan with down rod and clamp** complete	1st Day /Nos	0.00	80.00	80.00
	Add.10% more for erection in dome				
'11-1-14-B	Higher charges for providing erecting and Removing after use of good running condition **300 mm/ 400 mm size low noise oscillation type pedestal fan** of good condition.	1st Day /Nos	0.00	287.50	287.50
'11-1-14-C	Hire charges for providing, & erecting and dismantling after use of good running condition **600mm/900mm heavy duty air-circulator pedestal type fan** of good running condition.	1st Day /Nos	0.00	250.00	250.00
'11-1-14-D	Hire charges for providing erecting and dismantling after use of good running condition **Desert Cooler** complete with necessary water filling arrangements with stand & 3 core wire with top etc.,	1st Day /Nos	0.00	500.00	500.00
11-1-15	Hire charges for providing for temporary plug point with **5/15Amp plug switch combined,** erected in wooden board complete	1st Day /Nos	0.00	25.00	25.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-16	Hire charges for providing erecting and dismantling after use in good running condition with necessary interconnecting wire/cable in panel board.				
	(a) D.P. Switch 16A/32A, 230V	1st Day /Nos	0.00	31.00	31.00
	(b) T.P. Switch with neutral 16A/32A 440V	1st Day /Nos	0.00	40.00	40.00
	(C) T.P. Switch with neutral 63A/200A 440V	1st Day /Nos	0.00	80.00	80.00
	(d) TPN Switch 200A/250A, 400V	1st Day /Nos	0.00	250.00	250.00
	(e) BUSBAR (i) 63 Amp to 100 Amp. Up to 1 Mtr.	1st Day /Nos	0.00	120.00	120.00
	(e) BUSBAR (i) 63 Amp to 100 Amp. Above 1 Mtr.	1st Day /Nos	0.00	150.00	150.00
	(e) BUSBAR (ii) 200 Amp. Up to 1 Mtr.	1st Day /Nos	0.00	208.00	208.00
	(e) BUSBAR (ii) 200 Amp. Above 1 Mtr.	1st Day /Nos	0.00	245.00	245.00
	(f) Change Over Switches 4 Pole 440 V (i) 16 A - 32 A	1st Day /Nos	0.00	60.00	60.00
	(f) Change Over Switches 4 Pole 440 V (ii) 63 A	1st Day /Nos	0.00	170.00	170.00
	(f) Change Over Switches 4 Pole 440 V (iii) 100A - 125A	1st Day /Nos	0.00	280.00	280.00
	(f) Change Over Switches 4 Pole 440 V (iv) 200A - 300A	1st Day /Nos	0.00	450.00	450.00
	(g) Change Over Switches 4 Pole 440 V (v) 400 A	1st Day /Nos	0.00	790.00	790.00
	(h) Change Over Switches 4 Pole 440 V (vi) 630A	1st Day /Nos	0.00	1230.00	1230.00
	(I) Change Over Switches 4 Pole 440 V (vii) 800A	1st Day /Nos	0.00	1540.00	1540.00
	(j) Distribution Boards 3 phase 440V 6A/32A (i) 4 - 6 Way	1st Day /Nos	0.00	90.00	90.00
	(k) Distribution Boards 3 phase 440V 6A/32A (ii) 8-12 Way	1st Day /Nos	0.00	160.00	160.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(l) MCB Distribution boards Three phase 230V, (i) 4 -6 -8 Way	1st Day /Nos	0.00	290.00	290.00
11-1-17-b	Hire charges for providing erecting and dismantling after use in good running condition. **Section pillar** fabricated from 16 SWG thick M.S. Sheet with 40 x 40 x 6 mm thick angle iron legs with 12 mm thick bakelite / wooden sheet erected complete with following sizes (b) **Section pillar having size 75 x 60 x 45**	1st Day /Nos	0.00	300.00	300.00
11-1-17-c	Hire charges for providing erecting and dismantling after use in good running condition. **Section pillar** fabricated from 16 SWG thick M.S. Sheet with 40 x 40 x 6 mm thick angle iron legs with 12 mm thick bakelite / wooden sheet erected complete with following sizes (c) **Section pillar having size 60 x 30 x 45**	1st Day /Nos	0.00	170.00	170.00
11-1-18	Hire charges for providing & dismantling **pipe type earthing** for temporary electrical installation having G.I. pipe, erected in earth pit with necessary salt & charcoal & necessary earth wire.	1st day	0.00	115.00	115.00
11-1-19	Hire charges for providing, erecting & dismantling after use of good running condition for PVC **copper /Aluminium wire mains** with suitable copper PVC 1.5 / 2.5 Sq.mm earth wire of following size				
	(a) 2 wire 1 /1.5 / 2.5 Sq.mm **Copper**	1st. Day Per RMT.	0.00	3.25	3.25
	(a) 2 wire 1 /1.5 / 2.5 Sq.mm **Aluminium**	1st. Day Per RMT.	0.00	0.50	0.50
	(b) 2 wire 4 /6 Sq.mm **Copper**	1st. Day Per RMT.	0.00	4.25	4.25
	(b) 2 wire 4 /6 Sq.mm **Aluminium**	1st. Day Per RMT.	0.00	0.90	0.90
	(c) 4 wire 4 Sq.mm **Copper**	1st. Day Per RMT.	0.00	7.40	7.40
	(c) 4 wire 4 Sq.mm **Aluminium**	1st. Day Per RMT.	0.00	1.90	1.90
	(d) 4 wire 6 Sq.mm **Copper**	1st. Day Per RMT.	0.00	10.75	10.75
	(d) 4 wire 6 Sq.mm **Aluminium**	1st. Day Per RMT.	0.00	3.10	3.10
	(e) 4 wire 10 Sq.mm **Copper**	1st. Day Per RMT.	0.00	12.90	12.90

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(e) 4 wire 10 Sq.mm **Aluminium**	1st. Day Per RMT.	0.00	4.40	4.40
11-1-20-A	Hire charges for providing erecting as per direction of Engineer in charge dismantling after use of good running condition for temporary power supply the **XLPE insulated armoured cable Aluminium conductor** of following size.				
	(a) 2 Core 10 Sq.mm	1st Day /Mtr.	0.00	11.80	11.80
	(b) 4 Core 4 / 6 / 10 Sq.mm	1st Day /Mtr.	0.00	16.00	16.00
	(c) 4 Core 16 / 25 Sq.mm	1st Day /Mtr.	0.00	18.10	18.10
	(d) 3 1/2 Core 35 Sq.mm	1st Day /Mtr.	0.00	21.50	21.50
	(e) 3 1/2 Core 50 / 70 Sq.mm	1st Day /Mtr.	0.00	30.00	30.00
	(f) 3 1/2 Core 95 / 120 Sq.mm	1st Day /Mtr.	0.00	45.25	45.25
	(g) 3 1/2 Core 150 / 185 Sq.mm	1st Day /Mtr.	0.00	61.25	61.25
11-1-20-B	Hire charges for providing, erecting as per direction of Engineer-in-charge, dismantling after use of good running condition for temporary power supply, the **XLPE insulated armoured. cable multistrand Copper conductor** of following size				
	(a) 3 1/2 Core 35 Sq.mm	1st Day /Mtr.	0.00	50.00	50.00
	(b) 3 1/2 Core 50 Sq.mm	1st Day /Mtr.	0.00	75.00	75.00
	(c) 4 Core 16 Sq.mm	1st Day /Mtr.	0.00	93.75	93.75
	(d) 4 Core 25 Sq.mm	1st Day /Mtr.	0.00	43.75	43.75

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-21	Hire charges for providing, erecting with necessary connection and dismantling after user of good running **ELCBs/RCCBs** conforming to IS 12640 and having sensitivity of 30 Ma and Short circuit withstand capacity of 6 KA and suitable for operation on single phase 240 V having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max rating				
	(ii) 40 Amps D.P [Cat.II]	1st Day /Nos.	0.00	140.00	140.00
	(iii) 63 Amps D.P [Cat.II]	1st Day /Nos.	0.00	175.00	175.00
11-1-22	Hire charges for providing, erecting with necessary connection and dismantling after user of good running ELCBs/RCCBs conforming to IS 12640 and having sensitivity of 30 ma and short circuit withstand capacity of 6 KA and Suitable for operation on 3 Phase and neutral 415V having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max rating				
	(ii) 40 Amps FP [Cat.II]	1st Day /Nos.	0.00	160.00	160.00
	(iii) 63 Amps FP [Cat.II]	1st Day /Nos.	0.00	190.00	190.00
	(iv) 100 Amps FP (100m A Sensitivity) [Cat.II]	1st Day /Nos.	0.00	245.00	245.00
11-1-23	Hire charges for providing, erecting with necessary connection and dismantling after user of good running Approved make **Four Pole LT Heavy Duty Switch Disconnector Fuse Unit Cubical type** for panel mounting complete with operating mechanism suitable to operate on 415 V AC 23A duty with HRC fuses of suitable load confirming to I.S 13947 (Part I & III) of following capacities.				
	(a) 32 Amp [Cat.II]	1st Day /Nos.	0.00	125.00	125.00
	(b) 63 Amp [Cat.II]	1st Day /Nos.	0.00	160.00	160.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	© 125 Amp [Cat.II]	1st Day /Nos.	0.00	250.00	250.00
	(d) 200 Amp [Cat.II]	1st Day /Nos.	0.00	350.00	350.00
	(e) 250 Amp [Cat.II]	1st Day /Nos.	0.00	450.00	450.00
	(f) 315 / 320 Amp [Cat.II]	1st Day /Nos.	0.00	500.00	500.00
	(g) 400 Amp [Cat.II]	1st Day /Nos.	0.00	650.00	650.00
	(h) 630 Amp [Cat.II]	1st Day /Nos.	0.00	990.00	990.00
	(i) 800 Amp [Cat.II]	1st Day /Nos.	0.00	1150.00	1150.00
11-1-24	Hire charges for providing, erecting with necessary connection and dismantling after user of good running Supplying & erecting approved make **Four Pole 415V change over switch interior for panel mounting** with operating mechanism A.C. 23 duty confirming to I. S.S. for				
	(a) 32 - 40 A [Cat.II]	1st Day /Nos.	0.00	130.00	130.00
	(b) 63 A [Cat.II]	1st Day /Nos.	0.00	180.00	180.00
	(c) 100 - 125 A [Cat.II]	1st Day /Nos.	0.00	300.00	300.00
	(d) 200 A [Cat.II]	1st Day /Nos.	0.00	400.00	400.00
	(f) 315 / 320 A [Cat.II]	1st Day /Nos.	0.00	600.00	600.00
	(g) 400 A [Cat.II]	1st Day /Nos.	0.00	750.00	750.00
	(h) 630 A [Cat.II]	1st Day /Nos.	0.00	1100.00	1100.00
	(i) 1000 A [Cat.II]	1st Day /Nos.	0.00	1250.00	1250.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-01-25.	Hire charges for Providing & erecting weather proof, dust & vermin proof / floor mounted Front operated **outdoor type cubical Panel board having IP 64 protection** made from 14 SWG thick CRC MS sheet for outer body and doors, 16 SWG thick CRC MS Sheet for internal partition with neccessary supporting angles, flats including cutting,bending , drilling, welding revetting, with internal Partition and cable alley as per requirement & instruction of Engineer in charge with SUPPLY AND ERECTION OF of following type switchgears /busbars with suitable size of inter connecting PVC copper wire/ copper strips,rubber grommets,rib,earth bus and earth bolt, foundation flange- bolts - base plates, sufficient Nos. of Hinged doors, handles with locking arrangement &rubber gasket complete .The panel shall be painted with epoxy powder coating and have Cu. Busbar strips Each bus bar should insulated by color coded sleeve. WITH PHASE INDICATING Lamps--- Digital Multi function meter - Voltage, Amperes & Frequency only) with CTs coils) Each panel will contain earth bus and earth bolts with danger notice board.	1st Day /Nos.			
11-01-25a	[A] Cubical panel with main interior **400 A 4 pole on load Changeover switch and 400 A SFU/MCCB with four nos of 40 A DP MCB and four nos of 40 A FP MCB** as standard outgoing. Other outgoing is to be incorporated as demanded by engineer in charge and rate for the same is to be taken extra in addition to this.	1st Day /Nos.		22000.00	22000.00
11-1-25b	[B] Cubical panel with main interior **250 A 4 pole on load Changeover switch and 250A SFU/MCCB with four nos of 40 A DP MCB and four nos of 40 A FP MCB** as standard outgoing. Other outgoing is to be incorporated as demanded by engineer in charge and rate for the same is to be taken extra in addition to this.(Refer item no 11-1-26 & 11-1-27)	1st Day /Nos.		12000.00	12000.00
11-1-25c	**[C] Power Distribution Cubical Panel with main incomer 125A also with change over switch of 125A TPN MCCB - 1 Nos., 200 A Alum. Busbar, Outgoing 16A SP MCB 10 KA - 6 Nos, [Panel size 800mm H x 600 mm W x 350 mm D]**	**1st Day /Nos.**		**8000.00**	**8000.00**
11-1-26.	**63/100 A Four Pole Moulded Case Circuit Breaker** with spreader terminal and indication lamp mounted on cubical panel with complete proper termination .	1st Day /Nos.		885.29	885.29

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-27.	**200 A Four Pole Moulded Case Circuit Breaker** with spreader terminal and indication lamp mounted on cubical panel with complete proper termination .	1st Day /Nos		1916.50	1916.50
	Temp. Air Conditioning Machine				
11-1-28	Hire charges for providing erecting and dismantling after use of good running condition **Air Conditioning ductable type AC Machine complete with erection, gas charging etc having capacity up to 8.5 Ton**	1st day / Per Ton	0.00	2300.00	2300.00
11-1-29	Hire charges for providing , erecting and dismantling after use of good running condition **14" flexible 600 GSM,SRF duct for ductable types ac machine** one as per instruction of engineer in charge.	1st day / Per Rn.Mtr	0.00	325.00	325.00
11-1-30	Hire charges for providing, erecting and dismantling after use **1.0 / 1.5 ton window type Air-conditioning machine** complete with temporary frame and fabrication work & required materials to achieve cooling temp.	1st day / No.	0.00	815.00	815.00
11-1-31	Hire charges for providing erecting and dismantling after use of good running condition **temporary wooden frame made of teakwood for proper support of provide window AC unit** blocking the side openings around the unit by hard wood / plywood & placing the provided unit in approved manner complete.	1st day	0.00	690.00	687.50
11-1-32	Hire charges for providing, erecting and dismantling after use **portable type Air-conditioning machine** complete with erection ,gas charging and required flexible duct & required drain system etc. for 0.75 /1.0 Ton per one day as per instruction of engineer in charge.	1st day / No.	0.00	1900.00	1900.00
11-1-33	Hire charges for providing erecting and dismantling after use of good running **Tower type /Split type Air-Conditioning machine** complete with erection gas charging etc. (a) **1.5-2 ton for one day** as per instruction of engineer.	1st day / No.	0.00	3500.00	3500.00
11-1-34	Hire charges for providing erecting and dismantling after use of good running condition **Tower type/ split type Air-conditioning machine** complete with erection, gas charging etc. **(b) 3/4/5 Ton for one day** as per instruction of engineer.	1st day / No.	0.00	7000.00	7000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-35-A	Hire Charges for providing **90 Ltr capacity refrigerator** complete with M.S. stand if necessary connected with main switchgear & connecting earthing.	1st day / No.	0.00	940.00	940.00
11-1-35-B	Hire Charges for providing **165 Ltr capacity refrigerator** complete with M.S. stand if necessary connected with main switchgear & connecting earthing.	1st day / No.	0.00	1190.00	1190.00
11-1-35-C	Hire Charges for providing **250 / 280 Ltr capacity refrigerator** complete with M.S. stand if necessary connected with main switchgear & connecting earthing.	1st day / No.	0.00	1375.00	1375.00
11-1-36	Hire charges for providing **150 Ltr. Capacity water cooler** with candle type water filter & M.S. Stand with minor plumbing work, connected with main switchgear and connecting earthing.	1st day / No.	0.00	1100.00	1100.00
11-1-37.	Hire charges for Supplying and erecting **19 / 20 mm. nominal bore Medium Class M.S. Pipe down rod** erected with fan clamp/hook duly painted for fan complete with necessary 24/ O.20, 3 core flexible wire with earthing and installed in proper way to ensure vibration free movement..	Rn Mtr	0.00	13.00	13.00
11-1-38.	Hire charges for Supplying and erecting ISI mark Medium class **RIGID PVC /Flexible Pipes erected** on/in wall or ceiling erected with necessary fittings & boxes fixed with adhesive solution & Clamps in approved manner as directed	Rn Mtr		3.00	3.00
11-1-39.	Hire Charges for Providing,erecting &,commissioning & dismantling **AHU(Air Handling Unit) for circulating air** as part of air conditioning system upto 34 ton i.e four units of 8.5 ton.	1st day / No.		15000.00	15000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-1-40a	Hire charges for **LED Flood Light Fittings** with High Power White LEDs wattage of 1 Watt and above assemble on single MCPCB, efficiency more than 130 lm/w and corrosion free high pressure dia cast aluminum housing with smooth finish powder coated and hit sink extruded aluminum with diffuser and Polycarbonate optics/lenses with company mark/name engraved or embossed 120 to 300 V, Power factor more than 0.95, THD<10%, CCT 5000 K to 5700K, Uniformity ratio >0.45, Luminaire efficiency > 85 Lumens/Watt, LED driver efficiency >85%. CREE/OSRAM/PHILLIPS Lumileds /NICHIA/SEOUL/BridgeLux(U.S.A) make LED used for luminaire. (Each fitting required LM-79 & LM-80 Certificates) (B) Flood Light (IP-65), Surge -4KV (e) Above 150 watts to 240 watts Cat-III	1st day / No.		**1162.00**	**1162.00**
11-1-40b	(e) Above 100watts to 120 watts Cat-III	1st day / No.		**780.00**	**780.00**
11-1-40c	(e) Above 70 watts to 90 watts Cat-III	1st day / No.		**655.00**	**655.00**
11-1-41.	Hire charges for providing & dismantling earth pit of minimum bore dia.150mm size approved make **Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987** made of corrosion free G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanizing, Inner pipe dia of 25 mm having 200-250 Micron galvanizing, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications(a) For Electrical Installation up to 440V in normal soil Length of pipe - 1 Mtr Back filling compound - 1 Nos Bag of 15 Kg.	1st day / No.		750.00	750.00
11-1-42.	Hire charges for providing erecting and dismantling after use of good running condition **Industrial Air Cooler With Water filling** erected as per instruction of engineer-in -charge	1st day / No.	0.00	2250.00	2250.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
Chapter 11.2 / Diesel Generator Set					
11-2-1	Hire charges for **240V A.C generating set** following capacity with necessary fuel, mains, switchgears & accessories complete running on load / no load as per requirement. With transportation charges up to 30 kms..				
	[A] 1 KVA to 2 KVA	1 St.Day /no	0.00	1090.00	1090.00
	[B] 3 KVA to 10KVA	1 St.Day /no	0.00	4700.00	4700.00
11-2-2	Hire charges for**440V A.C generating set** following capacity with necessary fuel, mains, switchgears & accessories complete running on load / no load with acoustic sound proof enclosure etc as per requirement. With transportation charges up to 30 kms.				
	[A] 3 KVA to 10KVA	1 St.Day /no	0.00	4700.00	4700.00
	[B] 11 KVA to 25 KVA (excluding 25 KVA)	1 St.Day /no	0.00	5150.00	5150.00
	[C] 25 KVA to 40 KVA	1 St.Day /no	0.00	7500.00	7500.00
	[D] 50/62.5 KVA	1 St.Day /no	0.00	9000.00	9000.00
	[E] 75 KVA to 100 KVA	1 St.Day /no	0.00	18000.00	18000.00
	[F] 125 KVA	1 St.Day /no	0.00	24000.00	24000.00
	[G] 250 KVA	1 St.Day /no	0.00	38000.00	38000.00
11-2-3	Hire charges for providing, erecting, and dismantling after use Flexible PVC insulated **multistrand multi core 1.1 kv grade ISI marked copper wires** for sound system of following size.				
	a).2 5 Sq.mm 3 core round I PVC sheathed	Mtr	0.00	26.25	26.25
	b).4.0 Sq mm 3 core round PVC sheathed	Mtr	0.00	41.25	41.25

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
Temp. LED Screen & Videography items					
11-3-1.	Hire charges for Providing ,Erecting and dismantling,after use of good running for **Outdoor LED screen** with necessary suitable structure,back support,wiring with Optical fibre cables with standby arrangement from LED panel to console & necessary switchgear ,ELCB & earthing etc.LED screen having a P4.8 or latest updated module & having a each block of uniform size as suitable for site requirement with minimum refresh rate of 3000MHZ and IP65 protection and brightness >= 5000 Cd/m2 as per requirement on site as per direction of engineer in charge.				
11-3-1a.	(a) With truss Structure	1 St.Day. /sq.ft	0.00	625.00	625.00
11-3-1b.	(b) with metal/wooden structure	1 St.Day. /sq.ft	0.00	550.00	550.00
11-3-2.	Hire charges for Providing ,Erecting and dismantling,after use of good running for **indoor LED screen** with necessary suitable structure,back support,wiring with optical fibre cables with standby arrangement from LED panel to console & necessary switchgear ,ELCB & earthing etc.LED screen having a P4.8 or latest updated module & having a each block of uniform size as suitable for site requirement with minimum refresh rate of 1920MHZ,and IP54 protection,as per requirement on site as per direction of engineer in charge.				
11-3-2a	(a) With truss Structure	1 St.Day. /sq.ft	0.00	575.00	575.00
11-3-2b.	(b) with metal/wooden structure	1 St.Day. /sq.ft	0.00	500.00	500.00
11-3-3.	Hire charges for Providing ,Erecting and dismantling,after use of good running for **DTH system** having enough size disc for receiving digital signal and set up box as required for programme complete with good quality interconnecting wires and necessary top up recharge(Tata Sky, Airtel, Dish TV, etc...)	1 St.Day	0.00	1000.00	1000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-3-4.	Hire charges for Providing ,Erecting and dismantling,after use of good running for jimmy **jib motorized crane** of length as per site requirement with necessary mechanical safety and competent operating person with HD SONY or equivalent make camera as per direction of engineer in charge	1 St.Day/ Job.	0.00	20200.00	20200.00
11-3-5.	Hire charges for **watch out software with multiple layered playback system** having a latest licensed software version and media servers with multiple outputs and accessories with backup servers.	1 St.Day/ job.	0.00	150000.00	150000.00
11-3-6.	Hire charges for laying **armoured optical fiber cable** as per direction of engineer incharge	1 St.Day/ mtr.	0.00	25.00	25.00
11-3-7.	Hire charges **with WiFi unit wireless IP HD camera** as per direction of engineer in charge.	1 St.Day/ job.	0.00	20000.00	20000.00
11-3-8.	Hire charges for **OB van With necessary wired and wireless IP base HD camera** with necessary lenses. OB Van having required capacity of diesel generator, mixers, monitors,with suitable converters and processors with satellite connectivity.	1 St.Day/ job.	0.00	175000.00	175000.00
11-3-9.	Charges for **Making digital video " takhti"** with necessary music,graphics,special effects,voice and editing as per instruction	Per Job	0.00	20000.00	20000.00
11-3-10.	Hire charges for Providing ,Erecting and dismantling,after use of good running Condition for **digital projector** with spring loaded wire , wire screen connected with necessary mains switch gears & maintaining the same during function. (A) **lum.4500lm or higher** Digital input ,control input, memory input, audio input etc.	1 St.Day ./no	0.00	5000.00	5000.00
11-3-11.	Hire charges for providing, erecting and dismantling after use of good running for **HD Digital Video Recording (3CCD)** approved make Cameras for receiving and general shoots with competent authorized person (each camera) as per direction of Engineer-in-charge)with all cabling as site requirement	1 St.Day. / Job	0.00	15150.00	15150.00
11-3-12.	Hire charges for providing, erecting and dismantling after use of good running for **Live Black magic HD digital Set up** for mixing as per direction of Engineer-in-charge)with all cabling as site requirement	1 St.Day. / Job	0.00	50500.00	50500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-3-13.	Hire charges for providing, erecting and dismantling after use of good running for **High resolution on-line DVD making system and Digital Video recording set-up** and providing DVDs as per Function requirement as per direction of Engineer - in -charge)	1 St.Day / Job	0.00	3500.00	3500.00
11-3-14.	Hire charges for providing, erecting and dismantling after use of good running for **HD ON LINE RECORDER and Digital Video recording set-up** and providing DVDs as per Function requirement as per direction of Engineer - in -charge)	1 St.Day / Job	0.00	10100.00	10100.00
11-3-15.	Hire charges for providing, erecting and dismantling after use of good running for **42"LED TV complete** with necessary suitable cables as per requirement on site as per direction of Engineer - in - charge)	1 St.Day. / Job	0.00	6000.00	6000.00
11-3-16.	Hire charges for providing, erecting and dismantling after use of good running for **52"/55" LED TV complete** with necessary suitable cables as per requirement on site as per direction of Engineer - in -charge)	1 St.Day. / Job	0.00	7000.00	7000.00
	Temp. Stage light & Truss System				
	Hire charges for Providing erecting commissioning & Dismantling after use of **temporary lighting** as per instruction of Engineer in charge. The **Stage Lighting** consisting of Following with necessary stand by equipments in case of failure.				
	Lighting Equipment.				
11-4-1.	(a) 1000 Watts 240 Volts Par Lights 200 Nos. (b) 54x3W RGBW IP-67 (Cree or Osram Chip) LED Par Lights - 200 Nos. (c) Moving Head 20R (Beam, Spot, Wash) 3-in-1 Hybrid - 40 Nos. (d) Moving Head Sharpy (Beam) - 20 Nos. (e) LED Moving Head Wash - 24 Nos (f) Hazers - 8 Nos. (g) City colours 2500 Watts Lights - 8 Nos. (h) Follow Lights 2500 Watts - 4 Nos. (I) Control Dimmer - 8 Nos. (j) Sky Trackers - 4 Nos. (k) Fog Machine - 4 Nos. (l) Audience Blinder (4-eye) - 12 Nos.	1 St.Day /no		1555400.00	1555400.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-4-2.	Hire charges for Providing trussing for stage lighting as per instruction of event manager or engineer in charge it consisting of following.				
	Front and back Truss Sections - Total 240(120+120) feet Left & Right side Truss Sections- Total 120(60+60) feet 6 nos . Ground supports Towers. 2 Nos . front to back triangular sections. 6 nos CM Load star motor chain hoist. With necessary shekels belts, safety pins locks as per requirements.	1 St.Day ./no		444400.00	444400.00
	Temp Sound System				
11-5-1.	Hire charges for providing, erecting, Operating and dismantling the sound system consisting of following items duly cored with copper core (For one day) (a) 250W Audio Amplifier, 55A, 250W - 1 No. (b) High performance CD/DVD player and laptop- 1 No. (c) Horns with Units & matching transformer - 6 Nos. (d) 15" Speaker box two way 1000 watt - 4 Nos. (e) Microphone (shure/sennhieser) - 4Nos (f) Microphone Stand DGN - 4 Nos. (g) Cord wire with necessary cabling . (h) Voltage Stabilizer 3 KVA - 1 No. (i) 12V Battery - 1 No. (j) Cordless Microphone - 1 No. (K) Audio mixer 8/12/16 channel- 1 No. (L)Stage monitor- 2	1st Day/ Job	0.00	13750.00	13750.00
11-5-2.	Hire Charges providing, erecting, Operating and dismantling the sound system consisting of following items duly cored with core (For one days) 1. Power Amplifier QSC RM X 24500 - 8 Nos. 2. 250W Audio Amplifier SSA-250W - 6 nos. 3. 500W EM Booster SPA 5000 EM Booster - 2 nos. 4. High performance CD/DVD player and laptop- 1 No. 5. Horn with units and matching transformer 8.45+1100+1945 - 12 nos. 6. Cabinet Speaker with Hooper 5W x 650W - 20 nos. 7. Microphone Shoes SM 58 - 16 nos. 8. Microphone Stand (a) DGT 10 X 525.00 = 5250 - 1 Nos. (b) DGN 6 X 855 = 5130 - 6 Nos. 9. Voltage Servo Stabilizer 8KVA & UPS - 3 nos. 10. Battery - 2 nos. 11. Audio Mixer 24/32 Channel - 1 nos. 12. DI Box-4 nos. Effect Processor -1 no. 13. Cordless microphone - 1 nos. 14. Button Mike - 1 nos. 15.Crossover & equilizer-1 no 16.Stage monitor- 2 Nos. 17.necessary misc wire with cabling.	1st Day / Job	0.00	99000.00	99000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-3.	Hire charges for providing, erecting, testing & commissioning public address system / cultural programme 2 pair 3 way sound system having proper distribution of sound through out the fixed area comprising of the following (For one day) (1) Mid Top (15" inch speaker & 2 inch HF) 1000 watt - 8 Nos. (2) Base speaker (18" inch speaker) 10000 watt - 8Nos. (3) Power amplifier (QSC RMX2450) - 8 Nos. (4) Stage Monitor (500 Watt) - 4 Nos.&Side Fills Monitor(1000w)-2nos (5) Effect processor - 1 No (6) Active Cross over - 1 No. (7) Hand cordless Microphone - 3 Nos. (8) Microphone (SM58) - 10 Nos. (9) Microphone (SM57) - 5 Nos. (10) Audio Link 32 channel - 1 No (11) Microphone Stand - 15 Nos. (12) 24 channel audio mixer - 1 No. (13) CD & DVD player with Recorder / Pen Driver & laptop- 1 No. (14) 5 KVA Voltage Stabilizer - 1 No. with suitable Battery backup.	1st Day/ Job	0.00	200860.00	200860.00
11-5-4.	Hire Charges for providing erecting operating and dismantling the sound system consisting of following items duly Cored with copper Core. (For One days) (a) One No Audio amplifier up to 250W suitable for reproduction of sound (b) One No. DVD Player as per demand (c) Two No. Horn / Speaker with necessary matching transformer if required (d) Three Nos high sensitive Microphones of good quality with stand and cord Core of good quality (e) One No voltage stabilizer (f) One No. 12/24 V Battery (as a stand by)	1st Day / Job	0.00	3000.00	3000.00
11-5-5.	Hire charges for providing, erecting, testing & commissioning public address system / cultural programme 4 pair 3 way sound system having proper distribution of sound through out the fixed area comprising of the following (For one day) (1) Mid Top (15" inch speaker & 2 inch HF) 1000 watt - 12 Nos. (2) Base speaker (18" inch speaker) 10000 watt - 12 Nos. (3) Power amplifier (QSC RMX2450) - 12 Nos. (4) Stage Monitor (500 Watt) - 4 Nos. (5) Side Monitors (1000 Watt) - 2 Nos. (6) Effect processor - 1 No (7) Active Cross over - 1 No. (8) Equilizer (31 Bnd.) - 1 No. (9) Hand cordless Microphone - 4 Nos. (10) Microphone (SM58) - 12 Nos. (11) Microphone (SM57) - 6 Nos. (12) Audio Link 32 channel - 1 No (13) Microphone Stand - 18 Nos. (14) 24 channel audio mixer - 1 No. (15) CD & DVD player with recorder / Pen Driver - 1 No. (16) Laptop - 1 No. (17) 5 KVA Voltage Stabilizer - 1 No.with suitable Battery backup.	1st Day / Job	0.00	337150.00	337150.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-6.	Hire charges for providing, erecting, testing & commissioning public address system 6 to 8 pair 3 way Flying sound system having proper distribution of sound through out the fixed area comprising of the following for 1.0 to 1.5 lakh sq feet dome area. (For one day) (1) RCF HDL20 / JBL VRX - 2 WAY TOPS - 16 to 20 Nos. (2) RCF / JBL Dual 18 Inch Sub Woofers - 6 Nos. (3) 32 Channel Digital Console Inbuilt Effect Processor - 31 Band Equalizer - High Performance Pre Amp (Midas M32 / Behringer X32 or Equivalent) - 1 Nos. (4) Backup / Stand by console – 1no (Same or Equivalent Configuration Required) (5) Stage Monitors (800 Watt) - 4 Nos.(JBL VRX 915/ RCF V15/ JBL SRX 712 or Equivalent) (6) Side Fill Monitors (1000 Watt) - 2 Nos. (JBL / BNC/ RCF or Equivalent) - 2 Nos. (7) Active Cross Over - 1 Nos. (8) Microphones with Stand (Shure / Sennheiser or Equivalent) - 22 Nos. (9) DI Box (Behringer/ BSS/ Radial) - 8 Nos. (10) Cordless Microphones (Shure / Sennheiser or Equivalent) - 4 Nos. (11) Audio Link 32 Channel - 1 Nos. (12) High Performance CD/DVD Player /Laptop - 1 Nos. (13) 3 KVA UPS - 1 Nos. (14) 1 KVA UPS – 2Nos. (15) 2 Way Speakers – 4to6 Nos for Stand By System.	1st Day/job	0.00	750000.00	750000.00
11-5-7.	Hire charges for providing, erecting, testing & commissioning **public address system 6 to 8 pair 4 way/ 3 way Flying sound system** having proper distribution of sound through out the fixed area comprising of the following for 1.5 to 2.5 lakh sq.feet dome area. (For one day) (1) EAW KF740 / JBL VTX V20/RCF HDL20 / JBL VRX – 3WAY/2 WAY TOPS – 24to 36 Nos. (2) RCF / JBL Dual 18 Inch Sub Woofers - 6 Nos. (3) 32/48 Channel Digital Console Inbuilt Effect Processor - 31 Band Equalizer - High Performance Pre Amp (Midas M32 / Behringer X32 or Equivalent) - 1 Nos. (4) Backup / Stand by console – 1no (Same or Equivalent Configuration Required) (5) Stage Monitors (800 Watt) - 4 Nos.(JBL VRX 915/ RCF V35/ JBL SRX 712 or Equivalent) (6) Side Fill Monitors (1000 Watt) - 2 Nos. (JBL / BNC/ RCF or Equivalent) - 2 Nos. (7) Active Cross Over - 1 Nos. (8) Microphones with Stand (Shure / Sennheiser or Equivalent) - 22 Nos. (9) DI Box (Behringer/ BSS/ Radial) - 8 Nos. (10) Cordless Microphones (Shure / Sennheiser or Equivalent) - 4 Nos. (11) Audio Link 32 Channel - 1 Nos. (12) High Performance CD/DVD Player /Laptop - 1 Nos. (13) 3 KVA UPS - 1 Nos. (14) 1 KVA UPS – 2Nos. (15) 2 Way Speakers – 4to6 Nos for Stand By System.	1st day/job	0.00	1250000.00	1250000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-8.	Hire charges for providing, erecting, testing & commissioning public address system 6 to 8 pair 4 way/ 3 way Flying sound system having proper distribution of sound through out the fixed area comprising of the following for 2.5 to 4.0 lakh sq.feet dome area. (For one day) (1) EAW KF740 / JBL VTX V20/RCF HDL20 / JBL VRX – 3WAY/2 WAY TOPS – 36 to 50 Nos. (2) RCF / JBL Dual 18 Inch Sub Woofers - 6 Nos. (3) 32/48 Channel Digital Console Inbuilt Effect Processor - 31 Band Equalizer - High Performance Pre Amp (Midas M32 / Behringer X32 or Equivalent) - 1 Nos. (4) Backup / Stand by console – 1no (Same or Equivalent Configuration Required) (5) Stage Monitors (800 Watt) - 4 Nos.(JBL VRX 915/ RCF V35/ JBL SRX 712 or Equivalent) (6) Side Fill Monitors (1000 Watt) - 2 Nos. (JBL / BNC/ RCF or Equivalent) - 2 Nos. (7) Active Cross Over - 1 Nos. (8) Microphones with Stand (Shure / Sennheiser or Equivalent) - 22 Nos. (9) DI Box (Behringer/ BSS/ Radial) - 8 Nos. (10) Cordless Microphones (Shure / Sennheiser or Equivalent) - 4 Nos. (11) Audio Link 32 Channel - 1 Nos. (12) High Performance CD/DVD Player /Laptop - 1 Nos. (13) 3 KVA UPS - 1 Nos. (14) 1 KVA UPS – 2Nos. (15) 2 Way Speakers – 4to6 Nos for Stand By System	1st Day/job	0.00	1750000.00	1750000.00
11-5-9.	Additional Mid Top (15" inch Speaker&2" HF) 1000 watt	1 St.Day./NO	0.00	5400.00	5400.00
11-5-10.	Additional Base speaker (18"Speaker) 1000 Watt	1 St.Day./NO	0.00	2400.00	2400.00
11-5-11.	Additional Flying 2 Way Top (10 Inch Speakers and 2 HF)	1 St.Day./NO	0.00	9000.00	9000.00
11-5-12.	Additional Flying 3 Way Top (10/12/15 Inch Speakers and	1 St.Day./NO	0.00	12000.00	12000.00
11-5-13.	Additional Power Amplifiers (QSC RMX 2450)	1 St.Day./NO	0.00	3240.00	3240.00
11-5-14.	Additional cordless microphone,	1 St.Day./NO	0.00	960.00	960.00
11-5-15.	Additional collar / Button Mike	1 St.Day./NO	0.00	600.00	600.00
11-5-16.	Additional Microphone	1 St.Day./NO	0.00	240.00	240.00
11-5-17.	Additional Horn with units and matching transformer 8.45+1100=1945	1 St.Day./NO	0.00	240.00	240.00
11-5-18.	Additional Cabinet Speaker with Hooper 5W x 650W	1 St.Day./NO	0.00	240.00	240.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-19.	Hire charges for providing and erecting the Iron Scaffold towers of size 5' x 5'-0" x 25'-0" (High) with necessary supports and cross arms with necessary accessories as per requirement on site for erection of horns and halogen fittings as directed (For Two Days)	1 St.Day./ Job	0.00	12000.00	12000.00
11-5-20.	Hire charges for Bamboos to be erected as directed up to length 5-0 mtr. (including Transportation)	1 St.Day./ Job	0.00	30.00	30.00
11-5-21.	Hire charges for providing, erecting approved make 3.5KVA Inverter cum UPS system with operating capacity for input 160-270 V AC & inverter having output 230V 50Hz AC with 4 NOS 160 AH suitable voltage SMF batteries FOR 4 HRS BACKUP.	1 St.Day./ NO	0.00	4350.00	4350.00
11-5-22.	Hire charges for providing, erecting, Operating and dismantling the sound system for State Level Cultural Mega Event. Main Stage Front House Sound system shall consist of Eight pairs of line array tops, accompanied by subs as prescribed by manufacturer. (1) The array tops shall consist of dual 15" / 12" Transducers of 1200 watts for low / low mid frequency, Four 8" transducers of 600 watts for reproduction of mids and two or three compression drivers couples to horns of 300 watts for reproduction of high frequency- L acoustics K2, Nexo STM, Dus Aero 50, RCF-TT-55A, JBL Vertec-4889, EAW KF740 Only 90000 Watt Front of House 8 Pair (16 Nos.) (2) 2000 Watt with dual 18" Transducers for reproduction of Sub Woofers L Acoustics KS28, JBL 4880A, RCF 8006AS, EAW SB 1002/2001 Only Front of House 6 Pair (12 Nos.) (3) Digital Mixing Console - Digi Design Venue SC48, Sound Craft VI-3000, DIGICO SD10, YAMAHA-CL5. (4) Stage Monitors (JBL VRX 915/ RCF V35/ JBL SRX 712 or Equivalent) 8 Nos. (5) Side Fill Monitors (JBL / BNC / RCF or Equivalent) - 2 pair 3 way. (6) Cordless Microphones - 6 Nos. (7) Delay Stack shall consist of six pair Flying Line Array accompanied by prescribed no of Sub's Homogeneity in brands is compulsory Approx 50000 Watts. - 2 Nos.	1 St.Day./ job	0.00	1850000.00	1850000.00
11-5-23.	Hire Charges for providing, erecting, operating and dismentalling the sound system consisting of following items duly covered with copper core [For One Days] 1. 250W Audio Amplifier 55A 250W - 3 Nos. 2. Horns with Units & matching transformer - 6 Nos. 3. 12" Speaker box two way VS 300 - 4 Nos. 4. Microphone SM 58 - 6 Nos. 5. Microphone stand DGN - 6 Nos. 6. Tape recorder / CD play with C.D. - 1 No. 7. Voltage Stabilizer 3KVA - 1 No. 8. Cordless Microphone - 1 No.	1sIday/ job	0.00	31500.00	31500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-24.	Hire Charges for providing, erecting, operating and dismentalling the sound system consisting of following items duly covered with copper core [For One Days] 1. Power Amplifier QSE RM x 24500 - 4 Nos. 2. 250W Audio Amplifier SSA - 250W - 2 Nos. 3. 500W EM Booster SPA 5000 EM Booster - 2 Nos. 4. Tape Recorder / CD Player with CD - 2 Nos. 5. Horn with units and matching Transformer 845 + 1100 = 1945 - 6 Nos. 6. Cabinet speaker with woofer 5W x 650W - 8 Nos. 7. Microphone shure SM 58 - 8 Nos. 8. Microphone Stand (a) DGT 10 x 525.00 = 5250 - 2 Nos. (b) DGN 6 x 855 = 5130 - 6 Nos. 9. Voltage Servo Stabilizer 4 KVA - 1 Nos. 10. Audio Mixer 16 Channel - 1 No. 11. Effect Processor - 1 No. 12. Cord less microphone - 1 No.	1st Day/job	0.00	57750.00	57750.00
11-5-25	Hire charges for providing, erecting, testing & commissioning, operating, and dismentalling of Main Console System for public address system for PM / PRESIDENT / VVIP FUNCTION Digital Mixing Console, DIGI Design Venus SC-48 / DIGICO SD10, ALLEN & HEALTH D LIVE 7000, SOUND CRAFT VI 3000 , YAMAHA CL-5 - 2Nos. FOH & MOH Splitter(MIDAS DL431/ARX/WORLDWIND)-2 Nos for Stand by Console-1 Nos. Stage Monitors - 800 Watts -(JBL / VRX 915 / RCF V35 / JBL SRX 712 or Equi.) - 6 Nos. Side Fills Monitors (100-200 Watts) - JBL /BNC / RCF OR Equi - 2 Nos. Mixer, Line out with Monitors (100-200 Watts) - JBL /BNC / RCF or Equi. - 2 Nos. for Green Room area dome Active Crossover - 2 Nos. Microphone with stand (SHURE / SENNHEIZER OR Equi) - 22 Nos Podium Microphones (SHURE / SENNHEIZER / DPA) - 6 Nos. DI BOX (BEHRINGER / BSS / RADIAL) - 8 Nos. Cordless Microphones - (SHURE / SENNHEIZER OR EQUIVELENT) - 04 Nos AUDIO LINK 32 CHANNEL - 1 NOS. High Performance CD/DVD player- 1 No., Laptop with AV in-output 1 No. for Recording and playing. 3 KVA UPS - 2 NOS., & 1 KVA UPS - 3 NOS. 2 WAY Speakers for stand by system run on UPS - 4 Nos. Rates are for One day of Working and one day before testing (Not including Rehearsal)		0.00	325000.00	325000.00
11-5-26	Hire charges for providing, erecting, testing & commissioning, operating, and dismentalling of main PA System for public address system for PM / PRESIDENT / VVIP Function L ACOUSTIC / MEYER SOUND / D&B AUDIOTECHNICA / JBL / EAW - 3 WAY TOPS - Pair of Six Nos. and SUB WOOFERS - Pair of 3 Nos. Power Amplifier - 12Nos. for Above L ACOUSTIC/ JBL / EAW / D&b / RCF HDL 20 / 2 WAY 1000 WATT FOR CENTRE FILL - 4 Tops with necessary Amplifiers. All necessary truss, control power conditioner protection panels, signal wiring with enough spare wires/cables with safe guard protection. Rates are for One day of Working and one day before testing (Not including Rehearsal)		0.00	500000.00	500000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
11-5-27	Hire charges for providing, erecting, testing & commissioning, operating, and dismentalling of PAIR OF DE:AY STACK for public address system for PM / PRESIDENT / VVIP FUNCTION RCF HDL 20 / JBL VRX / L ACOUSTIC / MEYER SOUND / D&B AUDIOTECHNICA / JBL / EAW - 2 WAY OR 3 Way Tops - pair of 3/4 Nos. Power Amplifiers - 3 NOS NECESSARY AMPLIFIER POWER SUPPLY PANNEL - 1 NOS All necessary truss, control power conditioner protection panels, signal wiring with enough spare wires/cables with safe guard protection. Rates are for One day of Working and one day before testing (Not including Rehearsal)		0.00	125000.00	125000.00
11-5-28	Hire charges for providing, erecting, testing & commissioning, operating, and dismentalling of Sound Console system for public address system for CM/ VVIP FUNCTION 32 Channel Digital Console in built effect processor, 3I Band Equalizer , High performance, PRE AMP (MIDAS M32 / BERHINGER X32 OR EQUIVELENT) - 1 NOS. Stage Monitors- 800 Watts (JBL / VRX 915 / RCF V35 / JBL SRX 712 OR EQUIVELENT) - 4 Nos. Side fills Monitors-100 WATTS (JBL /BNC / RCF OR EQUIVELENT) - 2 Nos. Active Crossover - 1 Nos. Microphones with stand (SHURE / SENNHEIZER OR EQUIVELENT) - 22 Nos DI BOX (BEHRINGER / BSS / RADIAL) - 8 Nos. High Quality Cordless microphones-(SHURE / SENNHEIZER or equivalent.) - 04 Nos Audio Link 32 Channel - 1 Nos. High Performance CD/DVD player- 1 No., Laptop with AV in-output 1 No. for Recording and playing. 2 KVA UPS - 2 Nos. All necessary, control, signal wiring with enough spare wires/cables with safe guard protection. Rates are for One day of Working and one day before testing (Not including Rehearsal)		0.00	200000.00	200000.00
11-5-29	Hire charges for providing, erecting, testing & commissioning, operating, and dismentalling of public address system for CM/ VVIP FUNCTION RCF HDL 20 / JBL VRX - 2 WAY TOPS - Pair of 6 Nos. RCF 8006 AS SUBS / JBL DUAL 18" SUB WOOFER - Pair of 3 Nos. POWER AMLIFIER - 12 NOS RCF HDL 20 / 2 WAY 1000 WATT FOR CENTRE FILL - 4 TOPS NECESSARY AMPLIFIER POWER SUPPLY PANNEL - 3 NOS All necessary truss, control, signal wiring with enough spare wires/cables with safe guard protection. Rates are for One day of Working and one day before testing (Not including Rehearsal)		0.00	300000.00	300000.00

CHAPTER - XII

Repairing

CHAPTER-X11-REPAIRING

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	SECTION 12-1 / REPAIRING OF MONO BLOCK PUMP MOTORS				
12-1-1.	Removing the pump set from foundation after removing suction & discharge connection pipes & all wiring connections taking it to workshop & open it for fault finding , refitting the same after carrying out repairing, taking back on site refitting on foundation with pipe & wiring connections & put in working condition. (Excludes cost of repairing. Includes to & from transportation)				
	(a) Up to 3 HP	Job	0.00	230.00	230.00
	(b) Above 3 HP to 7.5 HP	Job	0.00	325.00	325.00
	(c) 10 Hp to 20 HP	Job	0.00	450.00	450.00
12-1-2.	Removing deteriorated gasket, gland packing, washer nuts & bolts before refitting of motor pump set.				
	(a) Up to 3 HP	Ea.	70.00	40.00	110.00
	(b) Above 3 HP to 7.5 HP	Ea.	120.00	45.00	165.00
	(c) 10 Hp to 20 HP	Ea.	170.00	45.00	215.00
12-1-3.	Rewinding of 230V single phase motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.				
	(A) up to 0.5 HP	Ea.	525.00	55.00	580.00
	(B) Upton 0.75 HP	Ea.	655.00	55.00	710.00
	(C) Upton 1.0 HP	Ea.	725.00	55.00	780.00
12-1-4.	Rewinding of 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.			
	(A) up to 1 HP	Ea.	740.00	100.00	840.00
	(B) Up to 1.5 HP	Ea.	810.00	100.00	910.00
	(C) Up to 2 HP	Ea.	940.00	100.00	1040.00
12-1-5.	Rewinding of 3 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	1250.00	130.00	1380.00
12-1-6.	Rewinding of 5 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	2300.00	200.00	2500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-1-7.	Rewinding of 7.5 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	2850.00	290.00	3140.00
12-1-8.	Rewinding of 10 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	3620.00	330.00	3950.00
12-1-9.	Rewinding of 12.5 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	5060.00	330.00	5390.00
12-1-10.	Rewinding of 15 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	6100.00	400.00	6500.00
12-1-11.	Rewinding of 20 H.P., 3 phase 440V motor as per original winding design by using super enamelled copper Wire and putting the same in working condition as per original.	Ea.	7200.00	550.00	7750.00
12-1-12.	Replacing burnout unserviceable ball bearing /roller bearing suitable for following motors for mono block pump sets				
	(A) For 1 H.P. motor/pump	Ea.	190.00	50.00	240.00
	(B) For 2 H.P. motor/pump	Ea.	280.00	50.00	330.00
	(C) For 3 H.P. motor/pump	Ea.	350.00	50.00	400.00
	(D) For 5 H.P. motor/pump	Ea.	380.00	80.00	460.00
	(E) For 7.5 H.P. motor/pump	Ea.	480.00	80.00	560.00
	(F) For 10/12.5 H.P. motor/pump	Ea.	690.00	80.00	770.00
	(G) For 15 H.P. motor/pump	Ea.	810.00	130.00	940.00
	(H) For 20 H.P. motor/pump	Ea.	850.00	130.00	980.00
	SECTION 12-2				
12-2-1.	Dewatering sump well by hiring pump sets & temporary pipe connections of following sump capacity				
	(a) up to 5000 Ltr	Job	0.00	320.00	320.00
	(b) Above 5000 Ltr to 20000 Ltr	Job	0.00	380.00	380.00
	(c) Above 20000 Ltr to 1 Lac Ltr	Job	0.00	520.00	520.00
	(d) Above 1 Lac Ltr	Job	0.00	750.00	750.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-2-2.	Opening the open well submersible mono pump set for fault finding , carry out required repairs refitting the same with necessary oiling, greasing & overhauling & making pump set in good working condition. (Excludes cost of repairing. Includes to & from transportation)				
	(i) 1HP to 5HP	Ea.	0.00	380.00	380.00
	(ii) 7.5 to 15HP	Ea.	0.00	510.00	510.00
	(iii) Above 15HP	Ea.	0.00	650.00	650.00
12-2-3.	Rewinding single phase 230V motor for open well horizontal mono pump set by using polycab copper winding wire & putting the same in working order for pump capacity of				
	(a) 0.5 HP - 230V	Ea.	1320.00	130.00	1450.00
	(b) 0.75 HP 230V	Ea.	1520.00	130.00	1650.00
	(b) 1HP - 230 V	Ea.	1820.00	130.00	1950.00
12-2-4.	Rewinding 3 phase, 440V motor for open well horizontal mono pump set by using poly. cap copper winding wire & putting the same in working order for pump capacity of				
	(a) 0.5 H.P./ 1 HP / 1.5 HP - 440V	Ea.	1620.00	130.00	1750.00
	(b) 2 HP / 3 HP - 440V	Ea.	1700.00	150.00	1850.00
	(c)5 HP - 440V	Ea.	2300.00	250.00	2550.00
	(d) 7.5 HP - 440V	Ea.	2800.00	250.00	3050.00
	(e) 10 HP - 440V	Ea.	3900.00	350.00	4250.00
	(f) 12.5 HP - 440V	Ea.	4450.00	350.00	4800.00
	(g) 15 HP - 440V	Ea.	4640.00	410.00	5050.00
	(h) 20 HP - 440V	Ea.	4840.00	460.00	5300.00
	(i) 25 HP - 440V	Ea.	6000.00	500.00	6500.00
	(j) 30 HP - 440V	Ea.	6630.00	520.00	7150.00
12-2-5.	Replacement of S.S. sleeves for shaft of open well horizontal submersible pump sets for				
	(i) 1HP to 5HP	Ea.	370.00	65.00	435.00
	(ii) 7.5 to 15HP	Ea.	680.00	65.00	745.00
	(iii) Above 15HP	Ea.	1150.00	65.00	1215.00
12-2-6.	Replacement of Stainless Steel bushing fitted in end shield for open well horizontal submersible pump set				
	(i) 1HP to 5 HP	Ea.	610.00	65.00	675.00
	(ii) 7.5Hp to 15 HP	Ea.	950.00	65.00	1015.00
	(iii) above 15 HP	Ea.	1170.00	65.00	1235.00
12-2-7.	Replacement of Gun metal /Bronze bushing for open well horizontal submersible pump set				
	(i) 1HP to 5 HP	Ea.	260.00	65.00	325.00
	(ii) 7.5Hp to 15 HP	Ea.	390.00	65.00	455.00
	(iii) above 15 HP	Ea.	465.00	65.00	530.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-2-8.	Replacing gasket, oil, nuts, bolts & washers for open well horizontal submersible pump sets.				
	(i) 1HP to 5 HP	Ea.	265.00	70.00	335.00
	(ii) 7.5Hp to 15 HP	Ea.	400.00	70.00	470.00
	(iii) above 15 HP	Ea.	465.00	70.00	535.00
12-2-9.	Replacement of Bronze / Carbon thrust bearing with fibber plate & bushing suitable for open well horizontal submersible pump set for				
	(i) 1HP to 5 HP	Ea.	1480.00	70.00	1550.00
	(ii) 7.5Hp to 15 HP	Ea.	1930.00	70.00	2000.00
	(iii) above 15 HP	Ea.	2480.00	70.00	2550.00
12-2-10.	Replacement of cast iron impeller for openwell horizontal submersible pump pump sets				
	(i) 1HP to 5 HP	Ea.	330.00	110.00	440.00
	(ii) 7.5Hp to 15 HP	Ea.	600.00	195.00	795.00
	(iii) above 15 HP	Ea.	1030.00	210.00	1240.00
12-2-11.	Replacement of Bronze / Gunmetal impeller for open well horizontal submersible pump set				
	(i) 1HP to 5 HP	Ea.	990.00	130.00	1120.00
	(ii) 7.5Hp to 15 HP	Ea.	1130.00	210.00	1340.00
	(iii) above 15 HP	Ea.	1450.00	210.00	1660.00

SECTION 12-3 / REPAIRING OF SUBMERSIBLE PUMP SETS

12-3-1.	Opening the submersible pump set for fault finding , carry out required repairs refitting the same with necessary oiling, greasing & overhauling & making pump set in good working condition. (Excludes cost of repairing. Includes to & from transportation)				
	(i) 1HP to 5HP	Ea.	0.00	330.00	330.00
	(ii) 7.5 to 15HP	Ea.	0.00	470.00	470.00
	(iii) 20HP to 35 HP	Ea.	0.00	595.00	595.00
	(iv) Above 35 HP	Ea.	0.00	810.00	810.00
12-3-2.	Rewinding of submersible motor by using approved make PVC insulated copper winding Cores of suitable size complete with connection. Capacity Suitable for pump of following size. Dismantled Materials to be retained by agency.				
	(A) 5 HP	Ea.	2195.00	190.00	2385.00
	(B) 7.5 H.P	Ea.	2780.00	210.00	2990.00
	(C) 10 to 15 H.P	Ea.	3720.00	330.00	4050.00
	(D) 16 to 20 H.P	Ea.	4250.00	430.00	4680.00
	(E) 21 to 25 H.P	Ea.	5310.00	500.00	5810.00
	(F) 26 to to 35 H.P	Ea.	6840.00	600.00	7440.00
	(G) 36 to 45 H.P	Ea.	10100.00	1350.00	11450.00
	(H) 46 to 54 H.P	Ea.	12900.00	2600.00	15500.00
	(I) 55 to 75 H.P	Ea.	27800.00	3200.00	31000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-3-3.	Replacement of bronze/ carbon thrust, bearing with fibre plate & housing for				
	(i) 150 mm. dia.	Ea.	1710.00	130.00	1840.00
	(ii) 200 mm. dia.	Ea.	2480.00	130.00	2610.00
12-3-4.	Replacement of motor bush, upper/ lower with sleeve with following material				
	(A) Bronze				
	(i)150 mm. dia.	Ea.	600.00	70.00	670.00
	(ii)200 mm. dia	Ea.	1210.00	70.00	1280.00
	(B)Rubber				
	(i) 150 mm. dia.	Ea.	360.00	30.00	390.00
	(ii) 200 mm. dia.	Ea.	600.00	30.00	630.00
12-3-5.	Replacement of stage casing bowl with nuts and bolts.				
	(A)C.I.				
	(i)150 mm. dia.	Ea.	400.00	70.00	470.00
	(ii)200 mm. dia	Ea.	610.00	70.00	680.00
	(B)Bronze				
	(i) 150 mm. dia.	Ea.	660.00	70.00	730.00
	(ii) 200 mm. dia.	Ea.	830.00	70.00	900.00
12-3-6.	Replacement of Bronze impeller with neck ring.				
	(i) 150 mm. dia.	Ea.	470.00	70.00	540.00
	(ii) 200 mm. dia.	Ea.	720.00	70.00	790.00
12-3-7.	Replacement of Shaft sleeve stainless steel.				
	(i) 150 mm. dia.	Ea.	70.00	15.00	85.00
	(ii) 200 mm. dia.	Ea.	170.00	15.00	185.00
12-3-8.	Replacement of Bowl bearing/ bush				
	(A) Rubber				
	(i)150 mm. dia.	Ea.	370.00	70.00	440.00
	(ii)200 mm. dia	Ea.	720.00	70.00	790.00
	(B) Lead				
	(i) 150 mm. dia.	Ea.	840.00	70.00	910.00
	(ii) 200 mm. dia.	Ea.	1310.00	70.00	1380.00
12-3-9.	Replacement of S.S.Shaft for				
	(A) 3 stage pump				
	(i)150 mm. dia.	Ea.	360.00	40.00	400.00
	(ii)200 mm. dia	Ea.	560.00	50.00	610.00
	(B) Add per stage				
	(i) 150 mm. dia.	Ea.	100.00	15.00	115.00
	(ii) 200 mm. dia.	Ea.	150.00	15.00	165.00
12-3-10.	Replacement of suction strainer				
	(i)150 mm. dia.	Ea.	130.00	25.00	155.00
	(ii)200 mm dia.	Ea.	230.00	40.00	270.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	SECTION 12-4				
12-4-1.(A)	Supplying and erecting approved make new power saver rotary sealed type compressor suitable for operation on 220 / 230 V 50 c/s. A.C. supply for One Ton capacity window/ Split type Air conditioner or water coolers of 150 Litre capacity	Ea.	13070.00	550.00	13620.00
12-4-1(B)	Supplying and erecting approved make Reciprocating compressor suitable for operation on 220 / 230 V 50 c/s. A.C. supply for One Ton capacity window/ Split type Air conditioner or water coolers of 150 Litre capacity	Ea.	14070.00	550.00	14620.00
12-4-2.	Supplying and erecting approved make new power saver rotary sealed type compressor suitable for operation on 220/23OV. 50 c/s. A.C. supply for 1.5 Ton capacity window/ Split type A.C.	Ea.	15240.00	550.00	15790.00
12-4-3.	Supplying and erecting approved make new power saver rotary sealed type compressor suitable for operation on 220/23OV. 50 c/s. A.C. supply for 2.0 Ton capacity window/Split type A.C.				
A	Rotary compressor	Ea.	15840.00	600.00	16440.00
B	Reciprocating compressor	Ea.	16830.00	600.00	17430.00
12-4-4.	Supplying and replacing the defective compressor (which is not opened at any time) by manufacturers factory repaired compressor.				
a	For 3024 Kcal / hr. (1.0 ton) refrigeration effect	Ea.	8750.00	400.00	9150.00
b	For 4536 Kcal / hr. (1.5 Ton) refrigeration effect	Ea.	10180.00	400.00	10580.00
c	For 6048 Kcal / hr. (2.0 ton) refrigeration effect	Ea.	12380.00	400.00	12780.00
12-4-5.	Supplying and replacing the defective Compressor (which is cut) should be replaced by new power saver rotary compressor by manufacturers factory repaired compressor				
	(a) for 3024 kcal / hr. (1 ton) refrigeration effect	Ea.	10180.00	450.00	10630.00
	(b) for 4536 kcal / hr. (1.5 ton) refrigeration effect	Ea.	10890.00	450.00	11340.00
12-4-6.	Supplying and replacing the 5 TR capacity defective compressor by new scroll compressor (A) Un-cut	Ea.	35640.00	750.00	36390.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-4-7.	Replacing old and unserviceable fan motor by new 1/6 H.P. two speed Fan motor, fan of 1350 to 1200 CFM flow suitable for A.C. machine.	Ea.	2420.00	75.00	2495.00
12-4-8.	Replacing new bushing suitable for fan motor of A.C. machine	Ea.	250.00	25.00	275.00
12-4-9.	Rewinding 1/6 H.P. two speed fan motor/ blower motor of air conditioner using supper enamelled copper wire complete putting in working order after varnishing and testing	Ea.	830.00	90.00	920.00
12-4-10.	Replacing fan motor capacitor 6 mfd by new for A.C. machine	Ea.	170.00	15.00	185.00
12-4-11.	Replacing unserviceable thermostats switch by new Danfoss or approved make thermostats switch having temp. range 15 ^{0}C to 30 ^{0}C for A.C. machine	Ea.	500.00	35.00	535.00
12-4-12.	Replacing starting capacitor of 80 to 120 MFD for 1.5 H.P. compressor motor of A.C. machine	Ea.	330.00	50.00	380.00
12-4-13.	Replacing unserviceable starting capacitor of 125 to 200 MFD for 2.5 H.P. compressor motor for A.C. machine.	Ea.	440.00	50.00	490.00
12-4-14.	Replacing unserviceable running capacitor of 36 MFD to 50 MFD upto 2.5H.P. compressor motor for A.C. machine upto 2 Ton. And for Single Phase Motor	Ea.	540.00	50.00	590.00
12-4-15.	Replacing the overload protector for compressor motor, winding if temp exceeds 240^{0} F with a time lag of 10 sec. suitable for 1.5 ton A.C. machine.	Ea.	300.00	50.00	350.00
12-4-16.	Replacing compressor starting relay by new on having pick-up voltage 220 V and drop-out voltage 120V suitable for 1.5 ton A.C. machine.	Ea.	330.00	50.00	380.00
12-4-17.	Replacing copper capillary tube of 0.055"/0.060"/0.064" bored and suitable for 1.0/ 1.5/2.0 ton A.C. machine	Ea.	165.00	25.00	190.00
12-4-18.	Replacing air filter for A.C. machine (a) PVC / NYLON / HDPE	Ea.	220.00	25.00	245.00
12-4-19.	Replacing wheel blower suitable for Window type A.C. machine.	Ea.	330.00	60.00	390.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-4-20.	Rewiring the entire window type A.C. machine with 2.5mm 2 flexible copper Core and putting the same in working order.	Ea.	385.00	75.00	460.00
12-4-21.	Removing the defective compressor for the A.C. machine by disconnecting the suction and discharge lines.	Ea.	0.00	250.00	250.00
12-4-22.	Erecting the new factory repaired compressor on the foundation of the window type A.C. machine with necessary sundry material and reconnection the suction and discharge line with compressor.	Ea.	0.00	450.00	450.00
12-4-23.	Flushing the line, leak testing, leak stopping, vacuuming, dehydrating and charging the gas in the refrigeration system for A.C. machine up to 2 TR	Ea.	1020.00	700.00	1720.00
12-4-24.	Overhauling and servicing the window type A.C.MACHINES by cleaning the condenser, cooling coil etc. by blower and oiling the fan motor and cleaning all necessary parts and putting the machine in working order.	Job	0.00	250.00	250.00
12-4-25.	Overhauling and servicing the window type A.C.MACHINES by Chemical cleaning of the condenser, cooling coil etc. by veniclean/Eq. material, water & cleaning all necessary parts and putting the machine in working order.	job	0.00	500.00	500.00
12-4-26.	Providing and erecting G.I. Sheet housing of A.C. machine with fabricating and painting complete.				
	(a)18 Gauge	Ea.	1430.00	150.00	1580.00
	(b) 16 Gauge	Ea.	2480.00	150.00	2630.00
12-4-27.	Replacing the fan blade for A.C. machine by new one.	Ea.	500.00	50.00	550.00
12-4-28.	Replacing the old grill by supplying and erecting new grill for Window type A.C. machine up to 2.0 TR	Ea.	1380.00	50.00	1430.00
12-4-29.	Replacing old and unserviceable rotary / selector switch by new 14 A four to five position 250 V rotary switch for A.C. machine	Ea.	200.00	50.00	250.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-4-30.	Providing and erecting Air Cooled Condenser unit having face area of 0.235 Sq.Mtr. made out of 27 / 30 gauge copper tube and cover with Aluminium fins of12-13FPI . For Window type A.C. Machine.				
	(a) for 1.0 TR A.C. Machine with 3/4 Row deep Coil	Ea.	3300.00	250.00	3550.00
	(b) For 1.5 TR A.C. Machine with 3/4 Row Deep coil	Ea.	3850.00	250.00	4100.00
	(c) For 2.0 TR A.C. Machine with 3/4 Row Deep coil	Ea.	4290.00	250.00	4540.00
12-4-31.	Providing, and erecting evaporator coil having suitable external surface area made out of copper tube with 0. 15 mm. thick Aluminium fins of 12-13FPI. For Window type A.C. Machine.				
	(a) for 1.0 TR A.C. Machine with 3/4 Row deep Coil	Ea.	2180.00	200.00	2380.00
	(b) For 1.5 TR A.C. Machine with 3/4 Row Deep coil	Ea.	2750.00	200.00	2950.00
	(c) For 2.0 TR A.C. Machine with 3/4 Row Deep coil	Ea.	3080.00	200.00	3280.00
12-4-32	Replacement of defective remote control hand set with new battery cells.				
	Window Air conditioner	Ea	830.00	0.00	830.00
12-4-33.	Shifting of Window A.C. The Scope includes dismantling, shifting, re-installing & re-commissioning of the units including topping up of Refrigerant gas.for 1.00, 1.5 & 2.0 TR capacity.	Ea.	0.00	1000.00	1000.00
12-4-34.	Replacement of defective remote control panel unit of window air conditioner.	Ea.	1980.00	200.00	2180.00
	SECTION 12-5 / REPAIRS TO SPLIT AIR CONDITIONERS				
12-5-1.	Providing and erecting Air Cooled Condenser unit having face area of 0.235 Sq.Mtr. made out of 27 / 30 gauge copper tube and cover with Aluminium fins of12-13FPI . For Split AC Machine				
	(a) for 1.0 TR A.C. Machine with 3/4 Row deep Coil	Ea.	3800.00	250.00	4050.00
	(b) For 1.5 TR A.C. Machine with 3/4 Row Deep coil	Ea.	4430.00	250.00	4680.00
	(c) For 2.0 TR A.C. Machine with 3/4 Row Deep coil	Ea.	4950.00	250.00	5200.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(d)Replacing wheel blower suitable for Split type A.C. machine.	Ea.	330.00	60.00	390.00
	(e)Replacing unserviceable running capacitor of 36 MFD to 50 MFD + 2 to 4 MFD Upto 2.5 H.P. compressor motor for A.C. machine upto 2 Ton..	Ea.	660.00	50.00	710.00
12-5-1.(B)	Replacing old and unserviceable Indoor unit Fan Blower motor by new 12 watt to 30 Watt capacity suitable for Split AC machine.	Ea.	1200.00	70.00	1270.00
12-5-2.	Providing, and erecting evaporator coil having suitable external surface area made out of copper tube with 0. 15 mm. thick Aluminium fins of 12-13FPI. For Split AC Machine				
	(a) for 1.0 TR A.C. Machine with 3/4 Row deep Coil	Ea.	2500.00	200.00	2700.00
	(b) For 1.5 TR A.C. Machine with 3/4 Row Deep coil	Ea.	3160.00	200.00	3360.00
	(c) For 2.0 TR A.C. Machine with 3/4 Row Deep coil	Ea.	3540.00	200.00	3740.00
12-5-3.	Replacement of defective remote control hand set with new battery cells.				
A	Split Unit - Local make	Ea	990.00	0.00	990.00
B	Split Unit -OEM make		1980.00	0.00	1980.00
12-5-4 (A)	repairing of PCB of remote control of split ac machine	ea.	1100.00	50.00	1150.00
12-5-4.(B)	Replacement of defective remote control panel assembly unit of Split air conditioner.	Ea.	2750.00	200.00	2950.00
12-5-5.	Shifting of Split A.C. The Scope includes dismantling, shifting, re-installing & re-commissioning of the units including topping up of Refrigerant gas, minor civil work wiring existing piping M S Stand electrical cabling with PVC drown piping for 1.00, 1.5 & 2.0 TR capacity.	Ea	0.00	2300.00	2300.00
12-5-6.	Replacing the defective indoor unit body by supplying and erecting new complete set of body up to 2.0 TR	Ea.	3960.00	250.00	4210.00
12-5-7.	Overhauling and servicing the Split type A.C MACHINES by Chemical cleaning of the condenser, cooling coil etc. by veniclean/Eq. material, water & cleaning all necessary parts and putting the machine in working order.	job	0.00	600.00	600.00
12-5-8.	Replacement of defective Oscillating louvers of Split air conditioner up to 2.0 TR capacity.	Ea.	820.00	250.00	1070.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-5-9.	Replacement of defective Oscillating motor of Split air conditioner up to 2.0 TR capacity.	Ea.	550.00	150.00	700.00
12-5-10.	Replacement of defective Oscillating louvers & motor connecting assembly of Split air conditioner up to 2.0 TR capacity.	Ea.	550.00	150.00	700.00
12-5-11.	Replacement of defective isolation/service valves of outdoor unit of Split air conditioner up to 2.0 TR capacity.	Ea.	490.00	50.00	540.00
	SECTION 12-6/ REPAIRS TO WATER COOLERS				
12-6-1.	Replacing old and unserviceable fan motor by new 1/10 to 1/12 H.P., 1250 RPM fan motor for water cooler.	Ea.	2370.00	150.00	2520.00
12-6-2.	Rewinding 1/10 to 1/12 H.P., 1250 RPM fan blower motor of water cooler using supper enamelled cooper Core with new bushes complete putting in working order after varnishing and testing.	Ea.	690.00	70.00	760.00
12-6-3.	Replacing the new bushing suitable for fan motor for water cooler.	Ea.	220.00	30.00	250.00
12-6-4.	Replacing unserviceable thermostat switch by Danfoss or approved make thermostat having range 1 c to 22 C for water switch for water cooler.	Ea.	470.00	35.00	505.00
12-6-5.	Replacing 4 MFD fan motor capacitor by new for water cooler.	Ea.	160.00	30.00	190.00
12-6-6.	Replacing, starting capacitor of 60 to 80 MFD for 1.5 H.P. compressor motor of water cooler.	Ea.	250.00	30.00	280.00
12-6-7.	Replacing unserviceable 25 to 36 MFD running capacitor for 1.5H.P. compressor motor of water cooler.	Ea.	470.00	40.00	510.00
12-6-8.	Replacing overload protector for compressor motor winding if temp. exceeds 240 F with a time lag of 10sec. suitable for water cooler.	Ea.	250.00	30.00	280.00
12-6-9.	Replacing compressor starting relay by new one having pick-up and drop-out voltage 220 V and 120 V resp. suitable for water cooler.	Ea.	300.00	40.00	340.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-6-10.	Rewiring the water cooler of any make with1.5 Sq. mm flexible copper Core and putting the same in working order.	Ea.	370.00	70.00	440.00
12-6-11.	Removing the defective compressor from the water cooler by dis-connecting the suction and dis- charge lines.	Job	0.00	250.00	250.00
12-6-12.	Erecting the new factory repaired compressor on the foundation of water cooler with necessary sundry material and re-connecting the suction and discharge lines with compressor.	Job	0.00	350.00	350.00
12-6-13.	Flushing the line, leak testing, leak stopping, vacuuming, dehydrating and charging the gas in the refrigeration system for water cooler machine including replacement of unserviceable liquid strainer.	Ea.	1020.00	450.00	1470.00
12-6-14.	finding out leakage from s.s tank and Soldering/welding of the leakage point of S.S. tank with necessary descaling and fitting the same S.S. tank bounded with cooling coil within outer body cover and insulating and refitting with testing complete.	Ea.	770.00	800.00	1570.00
12-6-15 (A).	Replacing the rusted openable top cover of the water cooler by new openable top cover with painting	Ea.	735.00	150.00	885.00
12-6-15 (B).	Replacing the rusted openable top cover of the water cooler by new G. I. powder coated openable top cover.	Ea.	1320.00	150.00	1470.00
12-6-15 (C).	Replacing the rusted openable top cover of the water cooler by new stainless steel openable top cover.	Ea.	1980.00	150.00	2130.00
12-6-16 (A)	Replacing the front rusted cover by new G.I. front cover suitable for water cooler duly painted.	Ea.	720.00	100.00	820.00
12-6-16 (B)	Replacing the front rusted cover by new front cover of Stainless steel suitable for water cooler.	Ea.	1870.00	100.00	1970.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-6-17 (A).	Replacing the rusted rear cover by new G.I. rear cover suitable for water cooler duly painted	Ea.	940.00	150.00	1090.00
12-6-17 (B).	Replacing the rusted rear cover by new stainless steel rear cover suitable for water cooler.	Ea.	1820.00	150.00	1970.00
12-6-18(A).	Replacing the rusted both side covers by new G.I.side covers suitable for water cooler duly painted.	Ea.	1160.00	150.00	1310.00
12-6-18(B).	Replacing the rusted both side covers by new stainless steel side covers suitable for water cooler.	Ea.	2040.00	150.00	2190.00
12-6-19.	Replacing the rusted foundation by new foundation fabricated from angle iron frame with necessary legs duly painted with black paints.	Ea.	830.00	150.00	980.00
12-6-20.	Replacing rusted fan motor stand fabricated from angle iron duly painted	Ea.	780.00	150.00	930.00
12-6-21.	Cleaning condenser coil and rusted bottom portion of water cooler and painting the same with black paints.	Ea.	170.00	80.00	250.00
12-6-22.	Spray painting of water cooler with hammertone approved quality of colour including black painting of rear cover	Ea.	1100.00	250.00	1350.00
12-6-23.	Replacing the old and unserviceable ball cock assembly by new one suitable for 1/2" G.I. pipe connection.	Ea.	160.00	50.00	210.00
12-6-24.	Replacing unserviceable PVC flexible inlet and outlet pipes.	Rft.	95.00	25.00	120.00
12-6-25.	Erection charges for water filter supplied by department.	Job.	0.00	70.00	70.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-6-26.	Supplying and erecting condenser unit Air cooled indigenous type having 9.5 mm OD (nominal) copper condenser tube and Aluminium fins complete suitable for water cooler.	Ea.	3225.00	215.00	3440.00
12-6-27.	Replacing unserviceable water tank assembly of stainless steel with necessary insulation surrounding the tank body of water cooler of following capacity.				
A	40 Ltrs cooling capacity./80 Ltrs storage capacity	Ea.	3960.00	450.00	4410.00
B	60 Ltrs cooling capacity./120 Ltrs storage capacity	Ea.	4950.00	450.00	5400.00
C	150 Ltrs cooling capacity./150 Ltrs storage capacity	Ea.	6260.00	600.00	6860.00
12-6-28.	Replacing unserviceable Push cock assembly by new crome plated brass push cock assembly.	Ea.	270.00	50.00	320.00
	SECTION 12-6-29 to 12-6-57 / REPAIRS TO R.O Plant				
12-6-29.	Providing ROW water booster pump for 10 Ltr.R.O. system	Ea.	2250	185	2435.00
12-6-30.	Providing Membranes for 10 Ltr. R.O. System	Ea.	2050	170	2220.00
12-6-31.	Providing & Erecting New Spun Filter and other Filter Set With Bowl.	Ea.	1800	150	1950.00
12-6-32.	Providing & Erecting Solenoid valve for 10 Ltr. R.O. System	Ea.	450	40	490.00
12-6-33.	Repairing and servicing labour charges for 10 Ltr. R.O. System	Ea.	0	500	500.00
12-6-34.	Providing Power Supply Adaptor for 10 Ltr. R.O. System	Ea.	800	10	810.00
12-6-35.	Providing ROW water booster pump for 25 Ltr.R.O. system	Ea.	4400	220	4620.00
12-6-36.	Providing Membranes for 25 Ltr. R.O. System	Ea.	4000	200	4200.00
12-6-37.	Providing & Erecting New Spun Filter and other Filter Set With Bowl.	Ea.	1800	150	1950.00
12-6-38.	Providing & Erecting Solenoid valve for 25 Ltr. R.O. System	Ea.	800	40	840.00
12-6-39.	Repairing and servicing labour charges for 25 Ltr. R.O. System	Ea.	0	500	500.00
12-6-40.	Providing Power Supply Adaptor for 25 Ltr. R.O. System	Ea.	800	10	810.00
12-6-41.	Providing ROW water booster pump for 50 Ltr.R.O. system	Ea.	4700.00	235.00	4935.00
12-6-42.	Providing Membranes for 50 Ltr. R.O. System	Ea.	4200.00	210.00	4410.00
12-6-43.	Providing & Erecting New Spun Filter and other Filter Set With Bowl.	Ea.	2000.00	160.00	2160.00
12-6-44.	Providing & Erecting Solenoid valve for 50 Ltr. R.O. System	Ea.	850.00	43.00	893.00
12-6-45.	Providing & Erecting new water level Sensor for 50 Ltr. R.O. System	Ea.	858.50	150.00	1008.50

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-6-46.	Providing & Erecting Hardware Material (elbow , pipe etc.) for 50 Ltr. R.O. System	Ea.	0.00	252.50	252.50
12-6-47.	Repairing and servicing labour charges for 50 Ltr. R.O. System	Ea.	0.00	303.00	303.00
12-6-48.	Providing Power Supply Adaptor for 50 Ltr. R.O. System	Ea.	900.00	10.00	910.00
12-6-49.	Providing Membrane 40 x 40 for 250 Ltr. R.O. Plant	Ea.	11413.00	0.00	11413.00
12-6-50.	Providing Row Water Pump & Putting the same in working condition for 250 Ltr. R.O. Plant	Ea.	909.00	150.00	1059.00
12-6-51.	Providing Vessel Service & multimedia material for 250 Ltr. R.O. Plant	Job.	5050.00	400.00	5450.00
12-6-52.	Providing Erecting auto R.O. work new panel board for 250 Ltr. R.O. Plant	Job.	4545.00	250.00	4795.00
12-6-53.	Repairing high pressure pump winding & Bearing for 250 Ltr. R.O. Plant	Job.	0.00	4545.00	4545.00
12-6-54.	Repairing solenoid valve and replacing coil for 250 Ltr. R.O. Plant	Job.	0.00	656.50	656.50
12-6-55.	Providing and Erecting 20" wound and spun Cartridge for 250 Ltr. R.O. Plant	Job.	383.80	150.00	533.80
12-6-56.	Providing & Erecting Hardware Material (elbow , pipe , union etc.) for 250 Ltr. R.O. System	Job.	0.00	1989.70	1989.70
12-6-57.	Repairing and servicing labour charges for 50 Ltr. R.O. System	Job.	0.00	4040.00	4040.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	SECTION 12-7				
	Note:-				
	(1) The All inclusive comprehensive maintenance cost covers the yearly maintenance cost of the electrical machineries with material & Labour cost including preventive maintenance. The cost covers entire installation from outlet of main switch to electrical machine..				
	(2)In case of Monoblock & Openwell pump sets following item covers cost of necessary plumbing works, repairs of foundations etc.				
	(3) All inclusive comprehensive maintenance cost of Window type / Split type Air conditioners & Water coolers covers the yearly maintenance & preventive maintenance with all required painting materials & labours. including sheet metal work, refrigerant gas , compressor & all the contains parts. The cost covers entire installation from outlet of main switch to the Unit.				
	(4) For A.M.C. of electrical installation Yearly rates not covered in following items. For such items rate shall be derived considering the current S.O.R. cost as capital cost & A.M.C. yearly rate shall be derived at 10 % Cost for estimation purpose only.				
12-7-1.	All inclusive comprehensive maintenance cost for the period of one year for the Mono block Pump sets & Starter/Starter Panel & wiring & Cables of following HP Capacity				
	(A) 1 HP & 1.5 HP Single/Three Phase	Ea.	0.00	1200.00	1200.00
	(B) 3 HP	Ea.	0.00	1600.00	1600.00
	(C) 5 HP	Ea.	0.00	2100.00	2100.00
	(D) 7.5 HP	Ea.	0.00	2700.00	2700.00
	(E) 10 HP /12.5 HP	Ea.	0.00	4500.00	4500.00
	(F) 15 HP	Ea.	0.00	6000.00	6000.00
	(G) 20 HP	Ea.	0.00	7200.00	7200.00
12-7-2.	All inclusive comprehensive maintenance cost for the period of one year for the Open Well Mono Pump sets & Starter/Starter Panel wiring & Cables of following HP Capacity				
	(A) 1 HP & 1.5 HP Single/Three Phase	Ea.	0.00	2000.00	2000.00
	(B) 3 HP	Ea.	0.00	2600.00	2600.00
	(C) 5 HP	Ea.	0.00	3500.00	3500.00
	(D) 7.5 HP	Ea.	0.00	4700.00	4700.00
	(E) 10 HP /12.5 HP	Ea.	0.00	6000.00	6000.00
	(F) 15 HP	Ea.	0.00	7500.00	7500.00
	(G) 20 HP	Ea.	0.00	8500.00	8500.00
	(H) 25 HP	Ea.	0.00	11000.00	11000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-7-3.	All inclusive comprehensive maintenance cost for the period of one year for the Submersible motor Pump sets & Starter/Starter Panel, Column Pipes, wiring & Cables of following HP Capacity				
	(A) 5 HP	Ea.	0.00	7000.00	7000.00
	(B) 7.5 HP	Ea.	0.00	8500.00	8500.00
	(C) 10 HP /12.5 HP	Ea.	0.00	11500.00	11500.00
	(D) 15 HP	Ea.	0.00	13500.00	13500.00
	(E) 20 HP	Ea.	0.00	15500.00	15500.00
	(F) 25 HP	Ea.	0.00	17500.00	17500.00
	(G) 30 HP	Ea.	0.00	21000.00	21000.00
	(H) 35 HP	Ea.	0.00	23500.00	23500.00
	(I) 40 HP	Ea.	0.00	25000.00	25000.00
	(J) 45/46 HP	Ea.	0.00	28000.00	28000.00
	(K) 50/55 Hp	Ea.	0.00	29500.00	29500.00
	(L) 60 HP	Ea.	0.00	30000.00	30000.00
12-7-4.	All inclusive comprehensive maintenance cost for the period of one year for the Window type Air-conditioning machine of following Capacity				
	(A) 1.0 to 1.5 ton capacity	Ea.	0.00	2300.00	2300.00
	(B) 2.0 ton capacity	Ea.	0.00	2800.00	2800.00
12-7-5.	All inclusive comprehensive maintenance cost for the period of one year for the Split type Air-conditioning Unit of following Capacity				
	(A) 1.0 ton capacity	Ea.	0.00	2350.00	2350.00
	(B) 1.5 ton capacity	Ea.	0.00	2400.00	2400.00
	(C) 2.0 ton capacity (Single Circuit)	Ea.	0.00	2850.00	2850.00
	(D) 2.0 ton capacity (Multi Circuit)	Ea.	0.00		
	(E) 3.0 ton capacity (Single Circuit)	Ea.	0.00	3050.00	3050.00
	(F) 3.0 ton capacity (Multi Circuit)	Ea.	0.00	4500.00	4500.00
	(G) 4.0 ton capacity (Multi Circuit)	Ea.	0.00	5000.00	5000.00
	(H)				
12-7-6.	All inclusive comprehensive maintenance cost for the period of one year for the water Cooler of following Capacity				
	(A) 80 Ltr capacity	Ea.	0.00	3100.00	3100.00
	(B) 120 / 150 Ltr capacity	Ea.	0.00	3900.00	3900.00
12-7-7.	All inclusive comprehensive maintenance cost for the period of one year for the water Heater(Geysers) inclusive inlet & outlet water connections flexible piping of following Type & Capacity				
	(C) 15 to 25 Ltr Storage Type	Ea.	0.00	650.00	650.00
	(D) 30 to 50 Ltr Storage Type	Ea.	0.00	750.00	750.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-7-8.	All inclusive comprehensive maintenance cost for the period of one year for ceiling fan inclusive cost of to and fro transportation & inclusive of dismantling & re-erecting on the proper location. Dismantled material to be retained by agency.	Ea.	0.00	160.00	160.00
12-7-9.	All inclusive comprehensive maintenance cost for the period of one year for Exhaust fan,Bracket fan,Pedestal fan inclusive cost of to and fro transportation & inclusive of dismantling & re-erecting on the proper location. Dismantled material to be retained by agency	Ea.	0.00	296.00	296.00
12-7-10.	All inclusive comprehensive maintenance cost for the period of one year for the Reverse Osmosis water purification system up to 50 Ltr/ Hr capacity.Inclusive replacing and cleaning of membranes , change of filter , uPVC pipe fitting and booster pump replacing one time in twelve month and servicing of RO System of following capacity(6 Services in Twelve months)				
	(A) 10 Ltr Capacity	Ea.	0.00	4720.00	4720.00
	(B) 25 Ltr Capacity	Ea.	0.00	8850.00	8850.00
	© 50 Ltr Capacity	Ea.	0.00	12980.00	12980.00
12-7-11.	All inclusive comprehensive maintenance cost for the period of one year for the Reverse Osmosis water purification system up to 100 to 1000 Ltr/ Hr capacity.Inclusive replacing and cleaning of membranes , change of filter , uPVC pipe fitting,and booster pump replacing one time in twelve month and servicing of RO System.It is also in scope of agency to replace 3-Phase row water pump,high pressure pump and micron cartridge filter if required for following capacity(6 Services in Twelve months)				
	(A) 100 Ltr Capacity	Ea.	0.00	24780.00	24780.00
	(B) 200 Ltr Capacity	Ea.	0.00	29500.00	29500.00
	(C) 300 Ltr Capacity	Ea.	0.00	33040.00	33040.00
	(D) 500 Ltr Capacity	Ea.	0.00	53100.00	53100.00
	(E) 1000 Ltr Capacity	Ea.	0.00	70800.00	70800.00
	(F) 2000 Ltr Capacity	Ea.	0.00	100300.00	100300.00
12-7-12.	All inclusive comprehensive maintenance cost for the period of one year for the Cassette type split Air-conditioning Unit of following Capacity				
	(A) 1.0 ton capacity	Ea.	0.00	3663.00	3663.00
	(B) 1.5 ton capacity	Ea.	0.00	4950.00	4950.00
	(C) 2.0 ton capacity	Ea.	0.00	6200.00	6200.00
	(E) 3.0 ton capacity - 3 Phase	Ea.	0.00	9460.00	9460.00
	(G) 4.0 ton capacity - 3 Phase	Ea.	0.00	10670.00	10670.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-7-13.	All in Comprehensive maintenance of Various Rating D.G. set for continuous trouble free operation for one year. 1. Replacing the fuel filters & Oil filters. 2. Checking the alignment and tappet setting. 3. Checking the carbon brushes / AVE. 4. Checking the oil level and replace the oil. 5. Leakages IN/OUT Cylinder. 6. All Electrical wrings including AMF panel if available. 7. Dynamo Setting. 8. RPM setting, Frequency & Voltage Adjustment. 9. Replacing material like fuel filters, gasket, tappet covers, diode rectifiers, Bridge rectifiers if found defective and in not working condition. 10. Kindly note that labour with spares is included in the above. 11. Major Overhauling & Top overhauling shall be included in scope of Agency. 12. including Replacement of Battery if it is not working.				
(A)	Continuous Rating of 10 KVA	Each	0.00	39810.00	39810.00
(B)	Continuous Rating of 15 KVA	Each	0.00	47550.00	47550.00
(C)	Continuous Rating of 20 KVA	Each	0.00	50192.25	50192.25
(D)	Continuous Rating of 25 KVA	Each	0.00	57891.75	57891.75
(E)	Continuous Rating of 30 KVA	Each	0.00	66150.00	66150.00
(F)	Continuous Rating of 40 KVA	Each	0.00	71970.00	71970.00
(G)	Continuous Rating of 50 KVA	Each	0.00	91830.00	91830.00
(H)	Continuous Rating of 62.5 KVA	Each	0.00	94860.00	94860.00
(I)	Continuous Rating of 75 KVA	Each	0.00	101100.00	101100.00
(J)	Continuous Rating of 82.5 KVA	Each	0.00	104235.00	104235.00
(K)	Continuous Rating of 100 KVA	Each	0.00	135885.00	135885.00
(L)	Continuous Rating of 125 KVA	Each	0.00	144435.00	144435.00
(M)	Continuous Rating of 140 KVA	Each	0.00	182670.00	182670.00
(N)	Continuous Rating of 160 KVA	Each	0.00	195975.00	195975.00
(O)	Continuous Rating of 180 KVA	Each	0.00	209355.00	209355.00
(P)	Continuous Rating of 200 KVA	Each	0.00	223140.00	223140.00
(Q)	Continuous Rating of 250 KVA	Each	0.00	276420.00	276420.00
	SECTION 12-8 Dismantling				
12-8-1	Dismantling the existing light, fan, bell, , independent plug point, wiring with mains of all types along with accessories etc. complete and handed over to dept.	Point	0.00	1.00	1.00
12-8-2	Refilling the holes for dismantled point with cable with cement mortar & finishing in an approved manner.	Point	3.00	6.00	9.00
12-8-3	Dismantling the existing cables of all types & sizes	Mtr	0.00	7.00	7.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-8-4	Dismantling the existing underground cable without damaging it with glands, cable end box including refilling the trench up to ground level and making coils complete to be placed at different store.	Mtr	0.00	11.00	11.00
12-8-5	Re-erecting PVC armoured cable 2 to 4 core up to 50 sq.mm on wall / pipe with necessary material & G.I. earth wire in an approved manner.	Mtr	0.00	8.00	18.00
12-8-6	Dismantling the existing switchgears, DB and Busbar of any size complete with / without board or angle iron frame.	Ea	0.00	8.00	8.00
12-8-7	Dismantling existing DO / AB switch set complete on D.P. structure in an approved manner.	Set	0.00	110.00	110.00
12-8-8	Dismantling existing OCB, ACB complete from existing panel board in an approved manner. Note:- Dismantled switchgears breakers to be handed to the Section In charge.	Ea.	0.00	44.00	44.00
12-8-9	Dismantling existing lightening arrestor set, insulator complete from DP structure in approved manner.	Set	0.00	28.00	28.00
12-8-10	Dismantling the existing ceiling fan / exhaust fan / cabin fan / bracket fan complete with accessories, G.I. down rod, frame etc. and making the site clear.	Ea.	0.00	10.00	10.00
12-8-11	Dismantling the existing pole up to 6 m height with brackets, clamps, insulators, stay from the cement concrete foundation and making the site clear by refilling the pits with excavated materials and bringing it to the ground level.	Ea.	0.00	215.00	215.00
12-8-12	Dismantling the existing pole above 6 m height with brackets, clamps, insulators, stay from the cement concrete foundation and making the site clear by refilling the pits with excavated materials and bringing it to the ground level.	Ea.	0.00	250.00	250.00
12-8-13	Dismantling the existing any type of indoor light fittings	Ea.	0.00	5.00	5.00
12-8-14	Dismantling the existing any type of street light fittings on pole up to 6 mt height with bracket and making the site as original complete.	Ea.	0.00	15.00	15.00
12-8-15	Dismantling the existing any type of fittings above 6 mt height pole from pole with bracket complete.	Ea.	0.00	30.00	30.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
12-8-16	Dismantling the existing electric geyser or storage type water heater of any size along with plumbing connection and making the site clear.	Ea.	0.00	25.00	35.00
12-8-17	Dismantling the existing Distribution Transformer / D.G. Set of any capacity from the plinth / foundation safely without any damages and storing it in safe place.	KVA	0.00	10.00	10.00
12-8-18	Dismantling existing pole mounted Distribution Transformer safely without any damages and storing it in safe place.	KVA	0.00	15.00	15.00
12-8-19	Dismantling the existing window type air conditioner of any type and capacity safely without any damages and making the site clear.	Ea.	0.00	150.00	150.00
12-8-20	Dismantling the existing split type air conditioner of any type and capacity safely without any damages and making the site clear.	Ea.	0.00	330.00	330.00
	Note:- The rates for item No 12-8-3 to 12-8-19are inclusive of transportation from site to section office.				

CHAPTER - XIII

Lifts

CHAPTER - XIII LIFTS	
	Note:-
	(a) General Features & Special Features of the all lift items shall be taken as below.
	(b) **for Handicap Lifts, Minimum 10 Passengers Lift Capacity** shall be considered.same is to be informed to architect / civil authority to keep necessary size of lift well.
	(c) **The lifts of 15/ 16 and above passenger capacity shall be taken for Hospital Lifts;** Where in Description " **Stretcher Lifts**" shall be mentioned.
	(d) **The Rates of the following items are for the lift of Machine room less** . For Machine room Lifts , rate for Rs. 1,50,000/- shall be **deducted in Total Cost** for the Lifts from 4 to 13 Passenger Lift. Rs. 2,00,000/- shall be deducted in Total Cost for the Lifts 15 and above passenger capacity as extra cost.
	(e) Add Rs. 80,000/- for the **DUPLEX control for the lifts** up to 10 floors and add Rs. 10,000/- for additional each floor above 10 floors.
	(A) GENERAL DESCRIPTION OF LIFTS.
	[1] **GEAR LESS LIFT DRIVE** comprising of **High Starting torque Lift 3 phase 440 V A. C. Permanent Magnet Synchronous motor** of proper rating with **high efficiency** shall be used [2] **Micro processor based / PLC, ACVVVF, vector control drive** with **encoder feedback closed loop system** shall be used for lift car and door operation which shall be **full collective selective operation hall call demand response** , UP/DOWN hall stops , Main, Up/ Down Contactor with **overload and phase reversal relay and safety controls.**
	[3] **Car with M S platform** with bracings of adequate size and to **sustain the impact load cabin + passenger with safety factor of fire** for steel and side panels of Stainless steel of sheet of grade 304 duty. **Car ceiling will be S .S. finishes with aesthetic appearance with LED ceiling lights . Car flooring shall be of anti skid PVC with choice of colour of engineer in charge . Car doors shall be of stainless steel grade 304**, hairline finish with centre opening / telescopic automatic doors. Car panel will also be S.S. 304 finished with **emergency stop device , mechanical door safety device , facility of auto/ attended mode**. All car panel buttons and all floor switches must be with **brail language** as per lift act.
	[4] **All landing doors must be fire rated for 2 hour** shall be fully **automatic centre opening/ telescopic opening** made of hairline finish steel grade of 304 with key holes and infrared curtains with Unlocking facility from outside [5] Appropriate **battery operated emergency light** in the car along with **alarm switch** shall be provided . Also, **Emergency Light & Fan** should start immediately without any Time Delay as soon as power fails [6] **Digital scrolling indicator system for up -down arrow along with floor position indicator** shall be provided inside the car and at all floors [7] **Full height infra red curtain with multiple cross / crossing light beams** shall be provided. [8] **Automatic Rescue Device (ARD)** shall be provided accordingly of passenger capacity with Manual Rescue Operation (Manual Cranking Facility). [9] **Audio visual indication in the lift car** showing over loading shall be provided such that doors kept open till excess load is removed

	[10] **Spring buffers /PU Buffers** shall be provided [11] **Car fan as per passenger capacity with automatic sleep timer** shall be provided. [12] **Voice annunciator with suitable music** shall be provided in lift car [13] **Self diagnostics system for operational and safety parameters shall be provided in control panel** [14] **Mechanical over speed governor with governor calibration as per actual site parameters** and **submission of calibration certificate** submission, door key holes in the floor doors , fireman switch shall be provided [15] Lift machine hoisting arrangement in the lift machine room and monkey ladder for lift pit should be provided by the lift agency , along with the other steel structure works foundations for the machine etc [16] In the hoist way fascia plate shall be provided without any extra cost , where ever required as / if directed by engineer in charge.
	[17] **Permanent wiring with necessary safety devices like RCCB in all circuit , Over Voltage Under Voltage protection and THD eliminator in circuit for lift machine room** and **lift well with proper numbers of light points , with fixtures, exhaust fan and plug points shall be provided by the agency** . Only 3 phase Power Supply shall be made available by department in lift machine room . **Necessary Earthing as per Lift Act/Rules shall be arranged by Lift Agency** [18] **Any civil/ electrical works for additional and alteration in lift shaft and machine room** related to erection of lift shall be made by lift agency without any extra cost (granite/marble fixing around all landing door openings are not in lift agency 's scope .) [19] **Agency has to provide all working drawings and documents and liaison services for obtaining all necessary permission from lift inspector and other authorities. [20] acrylic transparent licence/display A4 size holder in lift car**
	[20A] As per statutory requirement of Govt. Of Gujarat lift & escalator act 2000, lift agency has to provide 1. Car top safety barricade 2. Push & talk communication system 3. Fireman's switch operation at Ground Floor. 4.carrying out third party lift inspection during /after lift erection and provide report by third party authorized by concern licensing authority 5.agency has to provide third party insurance upto completion of free maintenance period and submit the document for the same.
	[21] Car Panel Operating Buttons with floor position indicator /buttons must be of Auto Glow type clearly visible when view from inside cabin [22] For Physically Handicapped person Full Length Handrails of hairline finish steel grade of 304 should be provided at appropriate height on the Rear & Side Wall Panels in Lift Car.
	(B) SPECIAL FEATURES DESCRIPTION OF LIFTS for PREMIUM category
	1. Advanced control system dual 64 bit embedded microprocessor with CANBUS Serial Communication mode including Regenerative power efficient operation,on site programming facility, Anti nuisance, Pte-opening, BMS/RMS with necessary online real time monitoring system having necessary connectivity for remote monitoring & other suitable supporting hardware & software devices to fulfil the purpose.
	2. Floor Indication LCD Display with call registration & brail mark with arrival gong and hall lantern & TFT Screen in the car with MP3 Voice Announcer.
	3. CAR Panel should be Scratch resistive SS Moonrock finish / Hair Line / Honeycomb for car and all Doors. All landing doors must have fire rating up to 2 hours and car door must have multi-level crisscross beam door protection.

	4. To & fro communication system & wiring (i.e. car, control room & guard room) and Each elevator are equipped with remote monitoring system.agency has to provide mobile app and user id and password for monitoring.				
13-1	**DESCRIPTION OF LIFT :**				
Item No	Supplying, Erecting, Testing & Commissioning the passenger / stretcher lift having following main features:				
Item No	**Description**	**Unit**	**Cost of Materials**	**Cost of Labour**	**Total**
13-1-A	4/5/6 Passengers, Ground plus 1 upper floor with Rated Speed of 1.0 m/sec,				
	(A) With General Specification attached herewith. Cat.II	Ea.	837200.00	209300.00	1046500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	946400.00	236600.00	1183000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1116752.00	279188.00	1395940.00
13-1-B	**4/5/6 Passengers,** Ground plus 2 upper floors with Rated Speed of 1.0 m/sec.				
	(A) With General Specification attached herewith. Cat.II	Ea.	901600.00	225400.00	1127000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1019200.00	254800.00	1274000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1202656.00	300664.00	1503320.00
13-1-C	4/5/6 Passengers, Ground plus 3 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	961400.00	240350.00	1201750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1086800.00	271700.00	1358500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1282424.00	320606.00	1603030.00
13-1-D	4/5/6 Passengers, Ground plus 4 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1016600.00	254150.00	1270750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1149200.00	287300.00	1436500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1356056.00	339014.00	1695070.00
13-1-E	4/5/6 Passengers, Ground plus 5 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1081000.00	270250.00	1351250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1222000.00	305500.00	1527500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1441960.00	360490.00	1802450.00
13-1-F	4/5/6 Passengers, Ground plus 6 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1140800.00	285200.00	1426000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(B) With General Specification attached herewith. Cat.III	Ea.	1289600.00	322400.00	1612000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1521728.00	380432.00	1902160.00
13-1-G	4/5/6 Passengers, Ground plus 6 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1311000.00	327750.00	1638750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1482000.00	370500.00	1852500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1748760.00	437190.00	2185950.00
13-1-H	4/5/6 Passengers, Ground plus 7 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1200600.00	300150.00	1500750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1357200.00	339300.00	1696500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1601496.00	400374.00	2001870.00
13-1-I	4/5/6 Passengers, Ground plus 7 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1380000.00	345000.00	1725000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1560000.00	390000.00	1950000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1840800.00	460200.00	2301000.00
13-1-J	4/5/6 Passengers, Ground plus 8 upper floors with Rated Speed of 1.0 / 1.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1265000.00	316250.00	1581250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1430000.00	357500.00	1787500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1687400.00	421850.00	2109250.00
13-1-K	4/5/6 Passengers, Ground plus 8 upper floors with Rated Speed of 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1449000.00	362250.00	1811250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1638000.00	409500.00	2047500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2280000.00	420000.00	2700000.00
13-1-L	4/5/6 Passengers, Ground plus 9 upper floors with Rated Speed of 1.0 / 1.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1334000.00	333500.00	1667500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1508000.00	377000.00	1885000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1779440.00	444860.00	2224300.00
13-1-M	4/5/6 Passengers, Ground plus 9 upper floors with Rated Speed of 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1518000.00	379500.00	1897500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1716000.00	429000.00	2145000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2024880.00	506220.00	2531100.00
13-1-N	4/5/6 Passengers, Ground plus 10 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	1580800.00	395200.00	1976000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1865344.00	466336.00	2331680.00
13-1-O	4/5/6 Passengers, Ground plus 10 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	1794000.00	448500.00	2242500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2116920.00	529230.00	2646150.00
13-1-P	4/5/6 Passengers, Ground plus 11 upper floors with Rated Speed of 2.0 /2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	1872000.00	468000.00	2340000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2208960.00	552240.00	2761200.00
13-1-Pa	4/5/6 Passengers, Ground plus 12 upper floors with Rated Speed of 2.0 /2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	1972000.00	468000.00	2440000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2333960.00	552240.00	2886200.00
13-1-Pb	4/5/6 Passengers, Ground plus 13 upper floors with Rated Speed of 2.0 /2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2072000.00	468000.00	2540000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2458960.00	552240.00	3011200.00
13-1-Q	8 / 10 Passengers, Ground plus 1 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	993600.00	248400.00	1242000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1123200.00	280800.00	1404000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1325376.00	331344.00	1656720.00
13-1-R	8 / 10 Passengers, Ground plus 2 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1076400.00	269100.00	1345500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1216800.00	304200.00	1521000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1435824.00	358956.00	1794780.00
13-1-S	8 / 10 Passengers, Ground plus 3 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1150000.00	287500.00	1437500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1300000.00	325000.00	1625000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1534000.00	383500.00	1917500.00
13-1-T	8 / 10 Passengers,. Ground plus 4 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1223600.00	305900.00	1529500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1383200.00	345800.00	1729000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1632176.00	408044.00	2040220.00
13-1-U	8 / 10 Passengers, Ground plus 5 upper floor with Rated Speed of 1.0 / 1.5 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1297200.00	324300.00	1621500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1466400.00	366600.00	1833000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1730352.00	432588.00	2162940.00
13-1-V	8 / 10 Passengers, Ground plus 6 upper floor with Rated Speed of 1.0 / 1.5 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1370800.00	342700.00	1713500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1549600.00	387400.00	1937000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1828528.00	457132.00	2285660.00
13-1-W	8 / 10 Passengers, Ground plus 6 upper floor with Rated Speed of 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1467400.00	366850.00	1834250.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1658800.00	414700.00	2073500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith **Prem. Cat.**	Ea.	1957384.00	489346.00	2446730.00
13-1-X	8 / 10 Passengers, Ground plus 7 upper floor with Rated Speed of 1.0 / 1.5 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1444400.00	361100.00	1805500.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1632800.00	408200.00	2041000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1926704.00	481676.00	2408380.00
13-1-Y	8 / 10 Passengers,. Ground plus 7 upper floor with Rated Speed of 1.75/ 2.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1541000.00	385250.00	1926250.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1742000.00	435500.00	2177500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2055560.00	513890.00	2569450.00
13-1-Z	8 / 10 Passengers, Ground plus 8 upper floor with Rated Speed of 1.5 / 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1614600.00	403650.00	2018250.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1825200.00	456300.00	2281500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2153736.00	538434.00	2692170.00
13-1-AA	8 / 10 Passengers, Ground plus 9 upper floor with Rated Speed of 1.5 / 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith, Cat.II	Ea.	1688200.00	422050.00	2110250.00
	(B) With General Specification attached herewith, Cat.III	Ea.	1908400.00	477100.00	2385500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2251912.00	562978.00	2814890.00
13-1-AB	8 / 10 Passengers, Ground plus 10 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith, Cat.III	Ea.	1991600.00	497900.00	2489500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2350088.00	587522.00	2937610.00
13-1-AC	8 / 10 Passengers, Ground plus 11 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith, Cat.III	Ea.	2074800.00	518700.00	2593500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2448264.00	612066.00	3060330.00
13-1-Aca	8 / 10 Passengers, Ground plus 12 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(A) With General Specification attached herewith. Cat.III	Ea.	2184800.00	518700.00	2703500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2573264.00	612066.00	3185330.00
13-1-Acb	8 / 10 Passengers, Ground plus 13 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2294800.00	518700.00	2813500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2698264.00	612066.00	3310330.00
13-1-AD	13 Passengers, Ground plus 1 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1159200.00	289800.00	1449000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1310400.00	327600.00	1638000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1546272.00	386568.00	1932840.00
13-1-AE	13 Passengers,. Ground plus 2 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1242000.00	310500.00	1552500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1404000.00	351000.00	1755000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1656720.00	414180.00	2070900.00
13-1-AF	13 Passengers, Ground plus 3 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1324800.00	331200.00	1656000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1497600.00	374400.00	1872000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. Cat.III	Ea.	1767168.00	441792.00	2208960.00
13-1-AG	13 Passengers, Ground plus 4 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1407600.00	351900.00	1759500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1591200.00	397800.00	1989000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1877616.00	469404.00	2347020.00
13-1-AH	13 Passengers,. Ground plus 5 upper floors with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1545600.00	386400.00	1932000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1747200.00	436800.00	2184000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2061696.00	515424.00	2577120.00
13-1-Al	13 Passengers, Ground plus 6 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1633000.00	408250.00	2041250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1846000.00	461500.00	2307500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2178280.00	544570.00	2722850.00
13-1-AJ	13 Passengers, Ground plus 7 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1720400.00	430100.00	2150500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1944800.00	486200.00	2431000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2294864.00	573716.00	2868580.00
13-1-AK	13 Passengers, Ground plus 8 upper floors with Rated Speed of 1.5 / 1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1807800.00	451950.00	2259750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2043600.00	510900.00	2554500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2411448.00	602862.00	3014310.00
13-1-AL	13 Passengers, Ground plus 9 upper floors with Rated Speed of 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1895200.00	473800.00	2369000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2142400.00	535600.00	2678000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2528032.00	632008.00	3160040.00
13-1-AM	13 Passengers, Ground plus 10 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2241200.00	560300.00	2801500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2644616.00	661154.00	3305770.00
13-1-AN	13 Passengers, Ground plus 11 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2340000.00	585000.00	2925000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2761200.00	690300.00	3451500.00
13-1-Ana	13 Passengers, Ground plus 12 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2465000.00	585000.00	3050000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2910700.00	690300.00	3601000.00
13-1-Anb	13 Passengers, Ground plus 13 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2590000.00	585000.00	3175000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3060700.00	690300.00	3751000.00
13-1-AO	15/16 Passengers, Ground plus 1 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1292600.00	323150.00	1615750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1461200.00	365300.00	1826500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1724216.00	431054.00	2155270.00
13-1-AP	15/16 Passengers, Ground plus 2 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1389200.00	347300.00	1736500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1570400.00	392600.00	1963000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1853072.00	463268.00	2316340.00
13-1-AQ	15/16 Passengers, Ground plus 3 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1476600.00	369150.00	1845750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1669200.00	417300.00	2086500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1969656.00	492414.00	2462070.00
13-1-AR	15/16 Passengers, Ground plus 4 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1573200.00	393300.00	1966500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1778400.00	444600.00	2223000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2098512.00	524628.00	2623140.00
13-1-AS	15/16 Passengers, Ground plus 5 upper floor with Rated Speed of 1.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1665200.00	416300.00	2081500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1882400.00	470600.00	2353000.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2221232.00	555308.00	2776540.00
13-1-AT	15/16 Passengers, Ground plus 6 upper floors with Rated Speed of 1.5 /1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1867600.00	466900.00	2334500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2111200.00	527800.00	2639000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2491216.00	622804.00	3114020.00
13-1-AU	15/16 Passengers, Ground plus 7 upper floors with Rated Speed of 1.5 /1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	1968800.00	492200.00	2461000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2225600.00	556400.00	2782000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2626208.00	656552.00	3282760.00
13-1-AV	15/16 Passengers,. Ground plus 8 upper floors with Rated Speed of 1.5 /1.75 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	2070000.00	517500.00	2587500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2340000.00	585000.00	2925000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2761200.00	690300.00	3451500.00
13-1-AW	15/16 Passengers, Ground plus 9 upper floors with Rated Speed of 1.75 / 2.0 m/sec.,				
	(A) With General Specification attached herewith. Cat.II	Ea.	2166600.00	541650.00	2708250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2449200.00	612300.00	3061500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2890056.00	722514.00	3612570.00
13-1-AX	15/16 Passengers, Ground plus 10 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2558400.00	639600.00	3198000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3018912.00	754728.00	3773640.00
13-1-AY	15/16 Passengers, Ground plus 11 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2667600.00	666900.00	3334500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3147768.00	786942.00	3934710.00
13-1-Aya	15/16 Passengers, Ground plus 12 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(A) With General Specification attached herewith. Cat.III	Ea.	2807600.00	666900.00	3474500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3312768.00	786942.00	4099710.00
13-1-Ayb	15/16 Passengers, Ground plus 13 upper floors with Rated Speed of 2.0 / 2.5 m/sec.,				
	(A) With General Specification attached herewith. Cat.III	Ea.	2947600.00	666900.00	3614500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3477768.00	786942.00	4264710.00
13-1-AZ	20 passengers , Ground plus 1 upper floors with Rated Speed of 1 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1375400.00	343850.00	1719250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1554800.00	388700.00	1943500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1834664.00	458666.00	2293330.00
13-1-BA	20 passengers , Ground plus 2 upper floors with Rated Speed of 1 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1462800.00	365700.00	1828500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1653600.00	413400.00	2067000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1951248.00	487812.00	2439060.00
13-1-BB	20 passengers , Ground plus 3 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1550200.00	387550.00	1937750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1752400.00	438100.00	2190500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2067832.00	516958.00	2584790.00
13-1-BC	20 passengers , Ground plus 4 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1637600.00	409400.00	2047000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1851200.00	462800.00	2314000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2184416.00	546104.00	2730520.00
13-1-BD	20 passengers , Ground plus 5 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1725000.00	431250.00	2156250.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(B) With General Specification attached herewith. Cat.III	Ea.	1950900.00	487500.00	2437500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2301000.00	575250.00	2876250.00
13-1-BE	20 passengers . Ground plus 6 upper floors with Rated Speed of 1.5/1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1899800.00	474950.00	2374750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2147600.00	536900.00	2684500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2534168.00	633542.00	3167710.00
13-1-BF	20 passengers . Ground plus 7 upper floors with Rated Speed of 1.5 /1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1996400.00	499100.00	2495500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2256800.00	564200.00	2821000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2663024.00	665756.00	3328780.00
13-1-BG	20 passengers . Ground plus 8 upper floors with Rated Speed of 1.5 / 1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2093000.00	523250.00	2616250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2366000.00	591500.00	2957500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2791880.00	697970.00	3489850.00
13-1-BH	20 passengers . Ground plus 9 upper floors with Rated Speed of 1.75 / 2.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2189600.00	547400.00	2737000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2475200.00	618800.00	3094000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2920736.00	730184.00	3650920.00
13-1-BI	20 passengers . Ground plus 10 upper floors with Rated Speed of 2.0 /2.5 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.III	Ea.	2584400.00	646100.00	3230500.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3049592.00	762398.00	3811990.00
13-1-BJ	20 passengers . Ground plus 11 upper floors with Rated Speed of 2.0 / 2.5 m/sec with micro price/PLC control and ACVVVF. drive				

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(A) With General Specification attached herewith. Cat.III	Ea.	2693600.00	673400.00	3367000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3178448.00	794612.00	3973060.00
13-1-Bja	20 passengers . Ground plus 12 upper floors with Rated Speed of 2.0 / 2.5 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.III	Ea.	2833600.00	673400.00	3507000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3343448.00	794612.00	4138060.00
13-1-Bjb	20 passengers . Ground plus 13 upper floors with Rated Speed of 2.0 / 2.5 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.III	Ea.	2973600.00	673400.00	3647000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3508448.00	794612.00	4303060.00
13-1-BK	26 passengers . Ground plus 1 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1490400.00	372600.00	1863000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1684800.00	421200.00	2106000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	1988064.00	497016.00	2485080.00
13-1-BL	26 passengers . Ground plus 2 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1683600.00	420900.00	2104500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	1903200.00	475800.00	2379000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2245776.00	561444.00	2807220.00
13-1-BM	26 passengers . Ground plus 3 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1784800.00	446200.00	2231000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2017600.00	504400.00	2522000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2380768.00	595192.00	2975960.00
13-1-BN	26 passengers . Ground plus 4 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1886000.00	471500.00	2357500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	(B) With General Specification attached herewith. Cat.III	Ea.	2132000.00	533000.00	2665000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2515760.00	628940.00	3144700.00
13-1-BO	26 passengers . Ground plus 5 upper floors with Rated Speed of 1.0 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	1982600.00	495650.00	2478250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2241200.00	560300.00	2801500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2644616.00	661154.00	3305770.00
13-1-BP	26 passengers . Ground plus 5 upper floors with Rated Speed of 1.5 / 1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2129800.00	532450.00	2662250.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2407600.00	601900.00	3009500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2840968.00	710242.00	3551210.00
13-1-BQ	26 passengers . Ground plus 6 upper floors with Rated Speed of 1.5 / 1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2079200.00	519800.00	2599000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2350400.00	587600.00	2938000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2773472.00	693368.00	3466840.00
13-1-BR	26 passengers . Ground plus 6 upper floors with Rated Speed of 1.5/1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2217200.00	554300.00	2771500.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2506400.00	626600.00	3133000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	2957552.00	739388.00	3696940.00
13-1-BS	26 passengers . Ground plus 7 upper floors with Rated Speed of 1.5 /1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2304600.00	576150.00	2880750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2605200.00	651300.00	3256500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3074136.00	768534.00	3842670.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
13-1-BT	26 passengers . Ground plus 8 upper floors with Rated Speed of 1.5 / 1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2392000.00	598000.00	2990000.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2704000.00	676000.00	3380000.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3190720.00	797680.00	3988400.00
13-1-BU	26 passengers . Ground plus 9 upper floors with Rated Speed of 1.5 /1.75 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.II	Ea.	2488600.00	622150.00	3110750.00
	(B) With General Specification attached herewith. Cat.III	Ea.	2813200.00	703300.00	3516500.00
	(C) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3319576.00	829894.00	4149470.00
13-1-BV	26 passengers . Ground plus 10 upper floors with Rated Speed of 1.75 / 2.0 / 2.5 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.III	Ea.	2922400.00	730600.00	3653000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3448432.00	862108.00	4310540.00
13-1-BW	26 passengers . Ground plus 11 upper floors with Rated Speed of 2.0 / 2.5 m/sec with micro price/PLC control and ACVVVF. drive				
	(A) With General Specification attached herewith. Cat.III	Ea.	3036800.00	759200.00	3796000.00
	(B) With General **PLUS ADDITIONAL SPECIAL FEATURES** attached herewith. **Prem. Cat.**	Ea.	3583424.00	895856.00	4479280.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	section 13.2 Additional facilities for lift				
13-2-2	Supplying & erecting approved make Lift Announcing solid state system in the Passenger/ Stretcher lifts having AC2/ACVV/ACVF drives & automatic doors only. The system comprising following features & facilities. (i) Announcing floor message, message to close period (ii) Announcing 'Emergency Message' when lift is stuck between floors due to power failure or any other reason. (iii) Instrumental Music between floor announcing. (iv) Announcement in English / Hindi & Gujarati Languages.. (v) Flexible to accommodate special per-programmed message such as name of the building /office. (vi)Volume adjustment control	Ea.	17000.00	3000.00	20000.00
13-2-3	Providing & erecting approved make overload non-start feature & overload warning Indicator system in the lift with making use of sound isolated floating platform & micro switches on SI frame to get sensation of live load inside lift cage at any given moment, with provides new fixtures of overload warning inside lift cage with new relay in the existing control panel to activate 'Overload Non-Start Function with carrying out additional wiring including laying of new travelling cable, include minor civil work & without changing the existing capacity speed stops, travel & operation of the desired lift	Ea.	35000.00	3000.00	38000.00
	SECTION XIII - 3				
	Repairing of lifts				
13-3-1	Replacing the Old worn-out traction steel elevator wire rope of following size and capacity as per IS: 2266/1989 complete with end connections by means of C.I. bull dog clip or sling / tapered babited sockets or screwed eyebolt.				
	A. 8 x 19 seal of 13mm.Dia.Having breaking capacity of 10 Tons weighting 0.68 Kg / Mtr. Approx.	Ea.	80.00	50.00	130.00
	B. 6 x 25 seal of 16 mm.dia.Having breaking capacity of 15 Tons weighting 0.95 Kg/Mtr. Approx.	Ea.	120.00	50.00	170.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
	C. 8 x 25 seal of 19 mm.dia.Having breaking, capacity of 20 Tons weighting 1.35 Kg/Mtr. Approx.	Ea.	140.00	50.00	190.00
13-3-2	Replacing unserviceable landing gate/lock by new spring operated mechanical electric inter lock compel. with lever brass/gun metal contacts, roller etc.	Ea.	2000.00	200.00	2200.00
13-3-3	Replacing unserviceable car gate lock/switch by new one with necessary rubber roller. 'L' & 'T' type M.S. brackets.	Ea.	600.00	50.00	650.00
13-3-4	Replacing unserviceable two way direction switch by new one operating UP & DOWN contactor coil by a ramp fitted to the car having copper contacts, lever, rubber roller, M.S. stud etc.	Ea.	2000.00	200.00	2200.00
13-3-5	Replacing burnout heavy duty magnetic contactor made from hard drawn or forged copper contacts faced with silver/silver tungsten or cadmium complete with 110V. A.C. or D.C. operating coil.	Ea.	600.00	50.00	650.00
13-3-6	Replacing burnout operating coils which operates on 110V. A.C. or D.C.	Ea.	800.00	50.00	850.00
13-3-7	Replacing burnout double wound earth screened step down transformer from 415VA.To 22OV/ 110V/24V/ 12V of capacity38OV/185VA for control panel of the lift complete with connections.	Ea.	3500.00	200.00	3700.00
13-3-8	Replacing burnout a full wave rectifier (one pole of which is earthed) by new one to operate D.C. relay to actuate brake of 3A. capacity.	Ea.	3500.00	200.00	3700.00
13-3-9	Replacing burnout guide shoe liner by new one made from fibber plate on three side duly fastened on rail bracket with necessary riveting /bolting and oiling for smooth sliding.	Ea.	600.00	200.00	800.00
13-3-10	Replacing, burnout brake liner by new heavy duty brake liner lined with Ferodo or Similar material complete with proper riveting including setting to ensure satisfactory performance.				
	(a) Size 6" x 1/4"	Ea.	3500.00	250.00	3750.00
	(b) Size 4" x 1/4"	Ea.	3000.00	150.00	3150.00
13-3-11	Overhauling of lift machine gear box by opening the cover & replacing the new gear oil, oil seal & packing & refixing the same, The rates includes the setting of brake for proper levelling.	Job	0.00	1500.00	1500.00

Item No	Description	Unit	Cost of Materials	Cost of Labour	Total
13-3-12	Rewinding of lift duty A.C. squirrel cage induction motor with supper enamelled copper wire & insulating materials including cost of removing, carting & re-erecting the same.				
	(a) 5 B. P. Motor.	Ea.	3500.00	200.00	3700.00
	(b) 7.5 H. P. Motor.	Ea.	3850.00	200.00	4050.00
	(c) 10. H. P. Motor.	Ea.	4600.00	300.00	4900.00
	(d) 12.5 H. P. Motor.	Ea.	6500.00	400.00	6900.00
13-3-13	Replacing worried out landing door bearing by new one complete with necessary M. S. bush, collar and stud as required. (a) For automatic door operation.	Ea.	400.00	200.00	600.00
13-3-14	Providing and Fixing Aluminium Chequered Plate on flooring of Lift having 6-7 mm thickness	Smt.	4500.00	150.00	4650.00
13-3-15	Providing & fixing PVC flooring in the lift car using 4 mm thick plywood sheet, PVC floor tiles of good quality, fixing the same by using adhesive material, hardware material and finishing the same	Ea.	1500.00	200.00	1700.00
13-3-16	Spray painting the lift car cage, lift doors with one coat of red oxide and two coats of approved Lacquer paint after applying necessary 'Lapi'-primer coating & complete the job as per instruction of engineer in charge.	Ea.	250.00	50.00	300.00

Tables

TABLE: 1

ESTIMATED CURRENT RATING FOR COPPER & ALUMINIUM CONDUCTORS VULCANISED RUBBER, PVC OR POLYTHENE INSULATED CABLES (SINGLE, TWIN, THREE & FOUR CORE)

ITEM	Standard COPPER Conductor	Continuous Current rating (Subject to Voltage Drop)					Standard ALUMINUM Conductor
	Area (Sq. inches)	In Conduit Toughing Or Casing (2 single core) cables) Amp.	Bunched in free air or open trench.		One Twin Core DC Or AC Amp.	One 3 or 4 core Cable Balanced 3 phases Amp.	Area (Sq. mm)
			2 single core Cables Amp	3 or 4 single core Cables Amps.			
1	2	3	4	5	6	7	8
1	0.0015	5	5	5	5	5	-
2	0.002	10	10	10/9	10	8/7	1.5
3	0.003	15	15	13/12	15	10/11	2.5
4	0.0045	20	20	15	20	15	-
5	-	20	20	17	20	14	4
6	-	27	27	24	27	19	6
7	0.007	28	28	25	28	20	-
8	-	34	34	31	34	24	10
9	0.01	36	36	32	36	25	-
10	0.145	43	43	39/38	43	30	16
11	0.0225	53	53	48	53	37	-
12	-	59	59	54	59	42	25
13	0.03	62	62	56	62	43	-
14	-	69	69	62	69	48	35
15	0.04	74	74	67	74	52	-
16	-	91	91	82	91	62	50
17	0.6	-	97	88	97	68	-
18	0.075	-	123	107	115	78	-
19	-	-	134	118	118	82	70
20	-	-	153	138	135	94	95
21	0.1	-	160	140	140	98	-
22	0.12	-	177	158	158	109	-
23	-	-	184	170	162	114	120
24	0.15	-	205	185	180	126	-
25	-	-	210	185	181	127	150
26	-	-	246	210	209	146	185
27	2	-	250	220	218	153	-
28	-	-	290	248	240	169	225
29	0.25	-	293	260	252	178	-
30	0.3	-	335	295	284	199	-
31	-	-	354	302	289	202	300
32	0.4	-	425	360	342	240	-
33	-	-	435	372	-	-	400
34	0.5	-	480	410	-	-	-
35	-	-	480	411	-	-	500
36	-	-	565	484	-	-	625
37	0.75	-	610	520	-	-	-
38	1.0	-	740	630	-	-	-

Ratings at Ambient Temperature 30 °C

For Ambient Temperature other than 30°C the current
Rating should be multiplied by the following rating factors:

	25°C	33°C	40°C	45°C
Rating factor:	1.13	0.85	0.69	0.47

In the above table, current rating (subject to voltage drop) has been given for copper conductor cables (in conventional British Standard sizes)
And also, for the cables with Aluminum conductors (in the new metric sizes as per I.S. 1753-1961). From this chart, the required size of an aluminum
Conductor can be established if either the Current Rating or the size of the copper conductor is known.

To establish the size of the Aluminum conductor against your requirement, read off the Current Rating for the conventional copper conductor
Cable (say, 7/0.64) and select the conductor size the conductor size from the last two columns (25 sq. mm.) which has a current rating equal to, or nearest to, that of the copper conductor cable.

TABLE: 2

CURRENT RATINGS (ac) FOR TWO, THREE & FOUR CORE
650/1100 VOLTS, ARMOURED OR UN-ARMOURED ALUMINIUM CONDUCTORCABLES
as per IS: 3961(PART II) – 1967.

Nominal Area of Conductor mm²	LAID DIRECT IN THE GROUND		IN DUCTS		IN AIR	
	2 Core	3,3 ½ & 4 Core	2 Core	3,3 ½ & 4 Core	2 Core	3,3 ½ & 4 Core
	Amps	Amps	Amps	Amps	Amps	Amps
1.5	18	16	16	14	16	13
2.5	25	21	21	18	21	18
4	32	28	27	23	27	23
6	40	35	34	30	35	30
10	55	46	45	39	47	40
16	70	60	58	50	59	51
25	90	76	76	63	78	70
35	110	92	92	77	99	86
50	135	110	115	95	125	105
70	160	135	140	115	150	130
95	190	165	170	140	185	155
120	210	185	190	155	210	180
150	240	210	210	175	240	205
185	275	235	240	200	275	240
240	320	275	275	235	325	280
300	355	305	305	260	365	315
400	385	335	345	290	420	375

CONDITIONS OF INSTALLATION

Maximum Conductor Temperature	70 °C
Ambient Air Temperature	40 °C
Ground Temperature	30 °C
Depth of Laying for Cables in Ground	75 Cm
Thermal Resistivity of Soil	150 Cm/Watt.
Method of Installation	Singly

TABLE: 3

Current-carrying capacities and associated voltage drops for twin and multicore armored P.V.C- Insulated cables (copper conductors)

Conductor operating temperature: 70 °c

Conductor Cross-Sectional Area	Installation methods (Clipped Direct)				Installation method (Defined conditions')			
	One twin cable single-phase A.C, Or D.C		One three-or four core cables, Three phases		One twin cable single-phase A.C Or D.C		One three-or four core Cable, three-phase	
	Current carrying capacity	Volt drop per ampere per meter	Current carrying capacity	Volt drop Per ampere per meter	Current carrying capacity	Volt drop Per ampere per meter	Current carrying capacity	Volt drop Per ampere per meter
1	2	3	4	5	6	7	8	9
MM2	A	MV	A	MV	A	MV	A	MV
1.5	20	29	18	25	-	-	-	-
2.5	29	18	24	16	-	-	-	-
4	37	12	31	9.6	-	-	-	-
6	48	7.4	41	6.3	50	7.3	42	6.3
10	66	4.3	56	3.8	69	4.3	58	3.8
16	86	2.7	73	2.3	90	2.7	77	2.3
25	115	1.8	97	1.6	121	1.8	102	1.6
35	142	1.3	119	1.1	149	1.3	125	1.1
50	168	0.92	147	0.81	180	0.92	155	0.81
		A.C				A.C		
70	209	D.C	180	0.57	220	D.C	190	0.57
95	257	0.65 0.	219	0.42	270	0.65	230	0.42
120	295	64	257	0.34	310	0.64	270	0.34
150	337	0.48 0.	295	0.29	355	0.48 0.4	310	0.29
		46				6		
185	390	0.40 0.	333	0.24	410	0.40 0.3	350	0.24
240	461	36	399	0.20	485	6	420	0.20
300	523	0.32 0.	451	0.18	550	0.32 0.2	475	0.18
400	589	25	523	0.17	620	5	550	0.17
		0.29 0.				0.29 0.2		
		23				3		
		0.25				0.24		
		0.1				0.18		
		8				0.23		
		0.23				0.14		
		0.1				0.22		
		4				0.11		
		0.22						
		0.11						

CORRECTION FACTORS

FOR AMBOENT TEMPERATURE

Ambient temperature	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

TABLE: 4

EARTHING READY RECKONER

S.No	Item	Copper	Aluminum	G.I
	WEIGHT OF CONDUCTOR Kg/MTR.			
1.	No. 14 SWG Wire.	0.028	-	0.0254
2.	No. 12 SWG Wire	0.049	0.0162 (6 MM²)	0.043
3.	No. 8 SWG Wire	0.1155	0.2703 (10 MM²)	0.102
4.	No. 6 SWG Wire	0.1668	-	0.1465
5.	No. 4 SWG Wire	0.243	-	0.224
6.	No 2 SWG Wire	0.344	0.0945 (35 MM²)	0.305
7.	25 X 3 MM Flat	0.670	0.202	0.590
8.	30 X 6 MM Flat	1.715	0.518	1.510
9.	50 X 6 MM Flat	2.680	0.810	2.360
10.	600 X 600 X 6 MM Thick Plate	19.30	5.83	17.00
11.	600 X 600 X 12 MM Thick Plate	38.30	11.66	34.00

RECOMMENDED EARTH CONDUCTORS FOR MOTORS:

1.	Up to 15 H.P	12 Swg.	6 MM²	8 Swg.
2.	Up to 20 to 30 H.P	8 Swg.	10 MM²	4 Swg.
3.	Up to 35 to 50 H.P	4 Swg.	35 MM²	25 X 3 MM Flat
4.	Above 50 H.P	25 X 3 MM Flat	25 X 6 MM Flat	32 X 6 MM Flat

G.I Conductor

Size	Area MM2	Nominal Dia MM	Approx Weight Kg. /M	Approx Resistance Ohm/M.
14 S W G.	3.24	2.03	0.026	0.0433
12 S W G.	5.48	2.64	0.044	0.02565
10 S W G.	8.35	3.26	0.067	0.0162
8 S W G	12.97	4.06	0.104	0.01063
4 S W G	27.27	5.89	0.218	0.00505
25 x 3 MM	75.00	-	0.600	0.0017
32 x 6 MM	192.00	-	1.536	0.0007
50 x 6 MM	300.00	-	2.400	0.00033

TABLE:5

SELECTION TABLE FOR STARTER / REALY / FUSE / CABLE FOR DOL MOTORS

H P 3 phases 415 V 50 HZ	KW 415 V 50 HZ	Approx. Full Load Current in AMPS	DOL Starter/Ctactor LT/LK Make	Relay Scale	Typical Backup HRC Fuse in AMPS	Typical Cabe Size Sq.mn AL
0.50	0.40	1.0	MK1 / ML0	1-1.6	6	1.5/2.5
0.75	0.55	1.5	MK1 / ML0	1.5-2.5	6	1.5/2.5
1.0	0.75	2.0	MK1 / ML0	1.5-2.5	10	1.5/2.5
1.5	1.1	2.6	MK1 / ML0	2.5-4.0	10	1.5/2.5
2.0	1.5	3.5	MK1 / ML0	2.5-4.0	15	1.5/2.5
3.0	2.25	5.0	MK1 / ML0	4.0-6.5	20	1.5/2.5
4.0	3.0	6.2	MK1 / ML0	4.0-6.5	20	1.5/2.5
5.0	3.75	7.5	MK1 / ML0	6.0-10	25	2.5
6.0	4.5	9	MK1 / ML0	6-10	25	2.5
7.5	5.5	11	MK1 / ML0	9-14	25	4.0
10	7.5	14	ML1	10-16	35	4.0
12.5	9.3	18	ML2	13-21	50	6.0
15	11	21	ML2	20-32	50	6.0
17.5	13	24	ML2	20-32	63	10.0
20	15	28	ML2	20-32	63	10.0
25	18.5	35	ML3	28-42	80	16
30	22	40	ML3	28-42	100	25
35	26	47	MK3 / ML4	45-70	125	25
40	30	55	MK3 / ML4	45-70	125	25
45	33.5	60	MK3 / ML4	45-70	160	35
50	37.5	66	ML 8	60-100	160	35
60	45	80	ML 8	60-100	160	50
75	56	100	ML 8	60-100	200	70
90	67.5	120	ML 8	90-150	250	95
100	75	135	ML 12	120-200	250	95
150	112	200	ML 12	180-300	350	185
200	150	275	ML 12	180-300	500	300/400
225	170	300	ML 12	180-300	600	300/400

TABLE: 6

SELECTION TABLE FOR STARTER/REPLY/FUSE/CABLE FOR STAR DELTA MOTOR

H P.3 phase 415 v 50 HZ	KW 415 V 50 HZ	Approx. Full Load Current in AMPS.	Phase Current In AMPS	Star Delta Starter Conractor LT/LK make	Relay Scale	Typical Back up HRC Fuse (AMPS)	Typical Cable Size Sq mm	
							Supply Side	Motor Side
3	2.25	5	2.88	MV1	2-5-4	10	1.5/2.5	1.5/2.5
5	3.75	7.5	4.32	MV1	4-6	20	1.5/2.5	1.5/2.5
7.5	5.5	11	6.34	MV1	6-10	25	2.5	1.5/2.5
10	7.5	14	8.10	MK1/ML1	6-10	25	4	1.5/2.5
12.5	9.3	18	10.02	MK1/ML1	9-14	35	4	2.5
15	11	21	12.10	ML1	10-16	50	6	2.5
20	15	28	16.00	ML1	10-16	63	10	4.0
25	18.5	35	20.00	ML2	20-32	63	16	6.0
30	22	40	23.00	ML2	20-32	100	16	6.0
35	26	47	27.00	ML2	20-32	100	25	10.0
40	30	55	30.00	ML3	28-42	100	25	16.0
45	33.5	60	34.6	ML3	28-42	125	35	16.0
50	37.0	66	35.0	ML3	28-42	125	35	16.0
60	45	80	45	ML3	30-45	125	50	25.0
65	48.5	87	50	MK3/ML4	45-70	160	70	35
70	52	94	54	MK3/ML4	45-70	160	70	35
75	56	100	57.5	MK3/ML4	45-70	160	70	35
90	67.5	120	69.0	ML8	60-100	200	95	50
100	75	135	78.0	ML8	60-100	200	95	50
125	90	165	95.0	ML8	60-100	250	120	70
150	112	200	115	ML8	90-150	250	185	70
175	132	230	133	ML8	90-150	300	225	120
200	150	275	159	ML12	120-200	250	300/400	150
240	175	320	184.5	ML12	120-200	400	300/400	185
250	187.5	323	185	ML12	120-200	400	400	185
275	204	360	206	ML12	180-300	400	500	185
300	225	385	222	ML12	180-300	500	500	225
400	300	500	390	ML12	180-300	700	625	300/400

TABLE: 7

SIZE OF CAPACITORS IN KVAR REQUIRED FOR GIVEN DEGREE OF POWER FACTOR CORRECTION. PER KW OF LOAD.

Initial Power factor.	Correction to				
	0.85	0.90	0.95	0.98	Unity.
1	2	3	4	5	6
0.50	1.112	1.248	1.403	1.529	1.732
0.51	1.066	1.202	1.357	1.483	1.686
0.52	1.024	1.160	1.315	1.441	1.644
0.53	0.980	1.116	1.217	1.397	1.600
0.54	0.939	1.075	1.230	1.356	1.559
0.55	0.899	1.035	1.190	1.316	1.519
0.56	0.860	0.996	1.151	1.277	1.480
0.57	0.822	0.958	1.113	1.239	1.442
0.58	0.785	0.921	1.076	1.202	1.405
0.59	0.748	0.884	1.039	1.165	1.368
0.60	0.714	0.849	1.005	1.131	1.334
0.61	0.679	0.815	0.970	1.096	1.299
0.62	0.645	0.781	0.936	1.062	1.265
0.63	0.613	0.749	0.904	1.030	1.233
0.64	0.580	0.716	0.871	0.997	1.200
0.65	0.549	0.685	0.840	0.966	1.169
0.66	0.518	0.654	0.809	0.935	1.138
0.67	0.488	0.624	0.779	0.905	1.108
0.68	0.459	0.595	0.750	0.876	1.079
0.69	0.429	0.565	0.720	0.840	1.049
0.70	0.400	0.536	0.691	0.811	1.020
0.71	0.372	0.508	0.663	0.783	0.992
0.72	0.343	0.479	0.634	0.754	0.963
0.73	0.316	0.452	0.607	0.727	0.936
0.74	0.289	0.425	0.580	0.700	0.909
0.75	0.262	0.398	0.553	0.673	0.882
0.76	0.235	0.371	0.526	0.652	0.855
0.77	0.209	0.345	0.500	0.620	0.829
0.78	0.183	0.319	0.473	0.594	0.803
0.79	0.156	0.292	0.447	0.567	0.776
0.80	0.130	0.266	0.421	0.541	0.750
0.81	0.104	0.240	0.395	0.515	0.724
0.82	0.078	0.214	0.369	0.489	0.698
0.83	0.052	0.188	0.343	0.463	0.672
0.84	0.026	0.162	0.317	0.437	0.645
0.85	...	0.136	0.291	0.417	0.620
0.86	...	0.109	0.264	0.390	0.593
0.87	...	0.083	0.238	0.364	0.567
0.88	...	0.054	0.209	0.335	0.538
0.89	...	0.028	0.183	0.309	0.512
0.90	...	...	0.155	0.281	0.484
0.91	...	...	0.124	0.250	0.453
0.92	...	...	0.097	0.223	0.426
0.93	...	...	0.066	0.192	0.395
0.94	...	...	0.034	0.160	0.363
0.95	...	...		0.126	0.329
0.96	...	...	...	0.089	0.292
0.97	...	...	...	0.047	0.250
0.98	...	...	...	...	0.203
0.99	...	...	...	...	0.143

Sample: - To find the capacitor rating required to correct a load of 97 KW At 0.67 P.F to 0.95 P.F

Required kVAr per Kw (vide table) =0.779

Total capacitor rating = 0.779 X 97 =@ 76kVAr.

Table: 8

TINNED COPPER FUSE WIRE TABLE

Approximate sizes of fuse elements composed of tinned copper wire for Use in semi-enclosed fuses.

The figures are an approximate guide only and the current at which the fuse will blow will depend upon the construction of the fuse holder in which the wire is used.

S.W.G	Diameter in inches.	Current rating of fuse in amperes	Approximate fusing current
40	0.0048	1.5	3
39	0.0052	2.5	4
38	0.0060	3	5
37	0.0068	3.5	6
36	0.0076	4.5	7
35	0.0084	5	8
34	0.0092	5.5	9
33	0.0100	6	10
32	0.0108	7	11
31	0.0116	8	13
30	0.0124	8.5	13
29	0.0136	10	16
28	0.0148	12	18
27	0.0164	13	23
26	0.0180	14	28
25	0.020	15	30
24	0.022	17	33
23	0.024	20	38
22	0.028	24	48
21	0.032	29	58
20	0.036	34	70
19	0.040	38	81
-	0.044	43	98
18	0.048	45	106
17	0.056	65	135
16	0.064	73	166
15	0.072	78	197
14	0.080	102	230
13	0.092	130	295

Maximum allowable Temperatures of Various types of Electrical Insulations

Insulation Classes	Maximum permissible temperature (Degree centigrade)
Y/O	90
A	105
E	120
B	130
F	155
H	180
C	Over 180

Common material used for various types of Electrical Insulations:

i) Class Y/O Insulation: Cotton, Silk or Paper
ii) Class A insulation : Reinforced Class Y materials with impregnated Varnish/ Insulation Oil
iii) Class E Insulation: Multiple layers of Class A Insulations
iv) Class B insulation: Inorganic materials. Like Mica, Fiberglass
v) Class F insulation: Class B materials upgraded with adhesives, silicon, and alkyd-resin varnish of high thermal endurance
vi) Class H insulation: Inorganic material glued with silicone resin or adhesives
vii) Class C insulation: 100% inorganic materials

HARMONICS EFFECTS IN POWER SYSTEM BASIC INFORMATION

The effects of harmonics in a power system are pervasive in that they influence system losses, system operation, and system performance. Unless the harmonics are controlled to acceptable limits, the power equipment and, even more so, the electronic equipment may be damaged resulting in and costly system outages.

The effects of harmonics are due to both current and voltage, although current-produced effects are more likely to be seen in day-to-day performance. Voltage effects are more likely to degrade the insulation and hence shorten the life of the equipment.

The following describes some of the common effects of harmonics:

a) Increased losses within the equipment and associated cables, lines, etc.,

b) Pulsating and reduced torque in rotating equipment,

c) Premature aging due to increased stress in the equipment insulation,

d) Increased audible noise from rotating and static equipment,

e) Mis-operation of equipment sensitive to waveforms,

f) Substantial amplification of currents and voltages due to resonances, and

g) Communication interference due to inductive coupling between power and communication circuits

TABLE NO - 9
RECOMANDED LEVELS OF ILLUMINATION FOR DIFFERENT TYPES OF THE BUILDINGS

No.	LOCATION	ILLUMINATION LEVEL IN LUX
(A) NON-RESIDENTIAL BUILDINGS:		
1	**Office Buildings:**	
	(a) Entrance Halls and Reception Area	150
	(b) Conference Rooms & Executive Offices	300
	(c) General Offices	300
	(d) Business Machine Operation	450
	(e) Drawing Offices	450
	(f) Corridors & Lifts	70
	(g) Stairs	100
	(h) Lift Landings	150
	(j) Telephone Exchange	200
2	**Hospitals:**	
	(a) Reception & Waiting Rooms	150
	(b) Wards	
	(i) General	100
	(ii) Beds	150
	(c) Operation Theater	
	(i) General	300
	(ii) Tables	Special Lighting
	(d) Laboratories	300
	(e) Radiology Department	100
	(f) Casualty & Outdoor Department	150
	(g) Stairs & Corridors	100
	(h) Dispensaries	300
	(i) Doctor's Surgeries	
	(1) Consulting Rooms	150
	(2) Corridors	70
	(3) Sight Testing, Wall Charts etc.	450
	(j) Hospital Kitchens	200
	(k) Laundries	200
3	**Auditorium & Theaters**	
	(a) Foyers	150
	(b) Auditoriums	70
	(c) Corridors	70
	(d) Stairs	100
4	**Assembly:**	
	(a) Foyers	100-150
	(b) Platforms	450
	(c) Corridors	70

No.	LOCATION	ILLUMINATION LEVEL IN LUX
5	**Schools & Colleges:**	
	(a) Class & Lecture Room	300
	(b) Plate form & Blackboard	300
	(c) Art Rooms	450
	(d) Staff Rooms, Common Rooms	150
	(e) Offices	300
	(f) Corridors	70
	(g) Stairs	100
	(h) Drawing Halls	300 to 450
6	**Residents**	
	(a) Entrance & Hallways	100
	(b) Living Room	300
	(c) Dining Room	150
	(d) Bed Room	300
	(e) Kitchen	200
	(f) Dressing Table	300
	(g) Bathroom	100
	(h) Mirror Light	300
	(i) Stairs	100
	(j) Garage	70
	(k) Study Room	300

TABLE-10
TYPE DESIGNATION AND CORE IDENTIFICATION OF CABLES & WIRE AS PER IS:1554 (1) & IS: 7098 (1)

Sr. No.	Code Letter	Constituent
1	A	Aluminum Conductor
2	Y	Plain Copper Conductor PVC insulated, unsheathed cables
3	AY	Aluminum conductor PVC insulated unsheathed cables
4	YY	Plain Copper Conductor PVC insulated & PVC sheathed cables
5	AYY	Aluminium conductor PVC insulated & PVC sheathed cables
6	YWY	PVC insulated & sheathed; steel round wire armoured with copper conductor cable
7	YFY	PVC insulated, sheathed, steel flat wire armoured with copper conductor
8	AYWY	PVC insulated & sheathed, round steel wire armoured cable with Aluminium conductor
9	AYFY	PVC insulated sheathed, flat steel wire armoured cable with aluminium conductor.
10	2X	XLPE insulation
11	W	Steel round wire armour
12	Wa	Non-Magnetic round wire armour
13	F	Steel strip armour
14	Fa	Non-Magnetic Strip Armour
15	FF	Double Steel Strip armour
16	WW	Double Steel round wire armour
17	Y	PVC outer sheath

Understanding cable code

1ST NUMERAL	2ND NUMERAL	3RD NUMERAL	4TH NUMERAL
Type of conductor	Conductor Insulation	Type Armouring	Type outer sheath
A.	Y	F	Y
Aluminium Conductor	PVC insulated	Steel Armouring	PVC sheathed
i.e. AYFY = PVC insulated, PVC sheathed Steel Armoured Aluminium cables.			

TABLE - 11

Return Air Grilles

Nominal Grill Size (Inches)	Gross 4rea (Sq.ft.)	Selection Criteria
16 x 4	.45	Return air grilles may be selected for the same velocity as for Supply air grilles keeping in view The maximum limits given in the Table below.
24 x 4	.67	
* 24 x 6	1.00	
* 30 x 6	1.25	
* 36 x 6	1.50	
* 30 x 8	1.67	
* 36 x 8	2.0	
30 x 10	2.1	
36 x 10	2.5	

* These sizes should be considered as standard and as far as possible only these should be used.

Return Air Diffusers		Return air diffusers may be Selected for the same velocity as for supply air diffusers keeping in view the maximum limits Gives in the table
9" dia.	.45	
12" dia.	.78	
15" dia.	1.22	
18" dia	1.76	
21" dia	2.40	

Table of Return Air Velocities Grilles Location	Recommended velocity Over Gross Area-fpm.
Within occupied zone not near seats	600-800
Within occupied zone near seats	400-600
Door or wall louvres, undercutting of doors, slots in false ceiling	200-300

TABLE - 12
CONVERSION TABLE

	To Convert	Multiply-by
(1)	Centimeters to Inches.....	0.3637
(2)	Cubic Centimeters to cubic inches.....	0.06103
(3)	Cubic feet to cubic meters.....	0.02832
(4)	Cubic feet to Gallons.....	6.228
(5)	Feet to Meters.....	0.3048
(6)	Gallons to Liters.....	4.536
(7)	Grammes to ounces....	0.03527
(8)	Grammes to Lbs....	0.002205
(9)	Inches to cms.....	2.54
(10)	Inches to Millimeters	25.4
(11)	Kilograms to Lbs.	2.205
(12)	Kilograms to Tons.....	0.0009842
(13)	Liters to Gallons.....	0.2205
(14)	Meters to feet.....	3.281
(15)	Meters to Yard.....	1.094
(16)	Miles to Kilometers	1.609
(17)	Ounces to Grammes.....	28.35
(18)	Lbs to Grammes.....	453.6
(19)	Lbs to Kilograms.....	0.4536

Temperature

F° to C°..... $C° = (F°-32) \times 5/9$

C° to F°..... $F° = \left[\frac{(C° \times 9)}{5} + 32\right]$

TABLE -13
WEIGTS OF MILD STEEL FLATS (Weight per foot in lbs)

Width In Inches	THICKNESS IN INCHES										
	1/16	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
6	1.28	2.53	3.38	5.10	6.38	7.65	10.20	12.75	15.30	17.85	20.40
5	1.06	2.13	3.19	4.25	5.31	6.38	8.60	10.63	12.75	14.88	17.00
4½	.956	1.91	2.87	3.83	4.78	5.74	7.65	9.56	11.48	13.39	15.30
4	.850	1.70	2.55	3.40	4.35	5.10	6.80	8.50	10.20	11.90	13.60
3½	.744	1.49	2.23	2.98	3.72	4.46	5.95	7.44	8.93	10.41	11.90
3	.638	1.28	1.91	2.55	3.19	3.83	5.10	6.38	7.65	8.93	10.20
2¾	.584	1.17	1.75	2.34	2.92	3.51	4.68	5.84	7.01	8.18	9.35
2½	.531	1.06	1.59	2.13	2.66	3.19	4.25	5.31	6.38	7.44	8.50
2	.425	.850	1.28	1.70	2.13	2.55	3.40	4.25	5.10	5.95	6.80
1¾	.372	.744	1.12	1.49	1.86	2.23	2.98	3.72	4.46	5.21	5.95
1½	.319	.638	.956	1.28	1.59	1.91	2.55	3.19	3.83	4.46	5.10
1¼	.266	.531	.797	1.06	1.33	1.59	2.13	2.65	3.19	...	...
⅞	.213	.425	.638	.850	1.06	1.28	1.70	2.13	2.55	...	...
1	...	.319	...	.637	...	...	...	...	...	...	...
.1	...	.625	...	.530	...	...	...	...	...	...	...

TABLE - 14
WEIGHT OF BRITISH STANDARD "ANGLES" & "TEES"

ANGLES						TEES	
Weight per foot in Lbs.						Size in Inches	Weight Per foot
Inches	1/8"	3/16"	1/4"	3/8"	1/2"	Inches	Wt.
¾ x ¾	0.53	-	-	-	-	1½ x 1½ x ¾	2.35 lbs
1 x 1	0.759	1.16	1.49	-	-	2 x 2 x ¼	3.22 lbs
1½ x ¼	1.00	1.47	1.91	-	-	2½ x 2½ x ¼	4.07 lbs
1½ x 1½	1.22	1.79	2.34	-	-	2½ x 2½ x 3/8	5.92 lbs
2 x 2	1.60	2.43	3.19	4.62	-	3 x 3 x 3/8	7.21 lbs
2½ x 2½	-	-	4.04	5.89	7.65	3 x 3 x ½	9.38 lbs
3 x 3	-	-	4.90	7.18	9.36	-	-
4 x 4	-	-	-	9.72	12.75	-	-
6 x 6	-	-	-	14.82	19.56	-	-

TABLE - 15
SQUARE AND ROUND BARS

0.7843 Kg / cm^2 per meter or 1 cft of steel = 490 lbs.

Diameter or Width mm.	Weight per meter	
	SQUARE Kg	ROUND Kg.
5.0	0.20	0.15
5.5	0.24	0.19
6.0	0.28	0.22
7.0	0.38	0.30
8.0	0.50	0.39
9.0	0.64	0.50
10.0	0.78	0.62
11.0	0.95	0.75
12.0	1.13	0.89
14.0	1.54	1.21
16.0	2.01	1.58
20.0	2.54	2.00
22.0	3.14	2.47
25.0	3.80	2.96
28.0	4.91	3.85
32.0	6.15	4.83
36.0	8.04	6.31
40.0	10.17	7.99
45.0	12.56	9.86
50.0	15.90	12.49
56.0	19.62	15.41
63.0	24.62	19.34
71.0	31.16	24.47
80.0	39.57	31.08
	50.24	39.46

	50.24	39.46

TABLE - 16
WEIGHT OF STEEL
0.7843 Kg / cm^2 per meter

BLACK SHEETS			PLATES		CHEQUERED PLATES	
Thickness in mm.	B.G.	Wt. Per Sq. mt. In KG.	Thickness in mm.	Wt. Per Sq. mt. In KG.	Thickness in mm.	Wt. Per Sq. mt. In KG.
3.15	10	24.70	5	39.2	7	61.1
2.50	12	19.61	7	55.0	10	84.6
2.00	14	15.69	10	78.5	12	100.3
1.66	16	12.55	12	94.2		
1.25	18	9.60	14	109.9		
1.00	20	7.84	16	125.6		
0.80	22	6.27	18	141.3		
0.63	24	4.94	20	157.0		
0.50	26	3.91	22	172.7		
0.44	28	3.10	25	196.2		

CONVERSION DETAILS OF G.I. WIRE, BOLTS ETC.

G.I.Wire :

1) G.I. Wire No 6 29.45 lbs = 100 yds
2) G.I. Wire No 8 10.86 lbs = 100 yds
3) G.I. Wire No 10 13.12 lbs = 100 yds
4) G.I. Wire No 12 8.62 lbs = 100 yds

Bolts and Nuts:

1) 1 ½ x ½ - 0.435 kg = 5 Nos
2) 1 ½ x 5/8 - 0.72 kg = 5 Nos
3) 2½ x ½ - 0.504 kg = 5 Nos
4) 2 ½ x 5/8 - 1 kg = 5 Nos
5) 2 x 5/8 - 0.78 kg = 5 Nos
6) 6 x 5/8 - 1.1 kg = 5 Nos
7) 4 x ½ - 0.7 kg = 5 Nos
8) 7 x ½ - 1.1 kg = 5 Nos
9) 7 x 5/8 - 1.78 kg = 5 Nos
10) 8 x ½ - 1.62 kg = 5 Nos
11) 8 x 5/8 - 2 kg = 5 Nos
12) 6 x 5/8 - 1.5 kg = 5 Nos
13) 5 x 5/8 - 1.4 kg = 5 Nos
14) 2 x 5/8 - 0.47 kg = 5 Nos
15) 4 x 5/8 - 1.25 kg = 5 Nos

Aluminium Binding tape - 1 lgs = 51 Rft
Aluminium Binding Wire - 1 lbs = 26 Rft
Barbed Wire - 250 lbs= 1000 yds.

TABLE NO 16-A

LINE PIPE DIMENTION **LINE PIPE WEIGHT** **MILD STEEL PIPES** **TUBES & PIPES**

LINE PIPE WEIGHT

Nominal Pipe Size		Outside Diameter	Sch *5	Sch *10	Schedule 20	Schedule 30	Standard weight	Schedule 40	Extra Strong	Schedule 60	Schedule 80	schedule 100	Schedule 120	Schedule 140	Schedule 160	Double Ex. Str.
mm	in	mm	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m	Kg/m
8	1/4	13.7	--	0.491	--	--	0.63	0.63	0.80	--	0.80	--	--	--	--	--
10	3/8	17.1	--	0.631	--	--	0.84	0.84	1.10	--	1.10	--	--	--	--	--
15	1/2	21.3	0.801	0.999	--	--	1.27	1.27	1.62	--	1.62	--	--	--	1.95	2.55
20	3/4	26.7	1.020	1.280	--	--	1.69	1.69	2.19	--	2.19	--	--	--	2.90	3.63
25	1	33.4	1.290	2.090	--	--	2.50	2.50	3.23	--	3.23	--	--	--	4.23	5.45
32	1 1/4	42.2	1.650	2.69	--	--	3.38	3.38	4.47	--	4.47	--	--	--	5.60	7.76
40	1 1/2	48.3	1.900	3.11	--	--	4.05	4.05	5.41	--	5.41	--	--	--	7.24	9.55
50	2	60.3	3.340	3.92	--	--	5.44	5.44	7.48	--	7.48	--	--	--	11.11	13.45
65	2 1/2	73.0	3.690	5.26	--	--	8.62	8.62	11.41	--	11.41	--	--	--	14.91	20.39
80	3	88.9	4.510	6.45	--	--	11.29	11.29	15.27	--	15.27	--	--	--	21.33	27.67
90	3 1/2	101.6	5.180	7.41	--	--	13.57	13.57	18.63	--	18.63	--	--	--	--	--
100	4	114.3	5.940	8.38	--	--	16.07	16.07	22.31	--	22.31	--	28.30	--	33.53	41.02
125	5	141.3	9.340	11.60	--	--	21.78	21.78	30.95	--	30.95	--	40.28	--	49.09	57.42
150	6	168.3	11.30	13.80	--	--	28.26	28.26	42.56	--	42.56	--	54.20	--	67.55	79.18
200	8	219.1	14.80	20.00	33.31	36.79	42.53	42.53	64.63	53.09	64.63	75.89	90.43	100.93	111.25	107.87
350	10	273.1	22.60	27.80	41.77	51.00	60.29	60.29	81.55	81.54	95.97	114.70	133.00	155.10	172.25	155.10
300	12	323.9	31.24	35.99	49.72	65.20	73.82	79.72	97.44	108.96	132.01	159.85	186.92	208.04	238.72	186.92
350	14	355.6	34.34	54.68	67.94	81.28	81.28	94.49	107.38	126.68	158.08	194.90	224.60	253.53	281.68	--
400	16	406.4	41.56	62.63	77.86	93.21	93.21	123.29	123.29	160.12	203.48	245.50	286.62	333.11	365.39	--
450	18	457	46.80	70.59	87.79	122.36	105.14	155.91	139.19	205.80	254.59	309.76	363.65	408.45	459.51	--
500	20	508	59.32	78.84	177.07	155.10	117.07	183.37	155.01	247.85						
550	22	559	65.30	86.50	129.01	171.01	129.01	--	171.01	--						
600	24	610	82.52	94.45	140.94	209.54	140.94	255.14	186.92	355.02						
650	26	660	--	127.50	202.83	--	152.87	--	202.83	--						
700	28	711	--	137.42	218.73	272.18	164.80	--	218.73	--						
750	30	762	118.33	147.36	234.64	292.06	176.73	--	236.64	--						
800	32	813	--	152.28	250.55	311.95	188.66	342.70	250.55	--						
850	34	864	--	167.20	266.46	331.83	200.59	364.58	266.46	--						
900	36	914	--	177.13	282.36	351.72	212.52	420.52	282.36	--						

TABLE- 17
DISTRIBUTION TRANSFORMERS

Check before erection and commissioning

(1) Oil Test: 30 Kv. Minimum across 4 mm gap for one minute.
(2) Insulation test: Minimum safe insulation resistance of windings at temperature.

	30°C	40°C	50°C	60°C	Voltage of Meggar
L.T.	200 M Ω	100	50	25	500 Volts.
11 Kv.	400 M Ω	200	100	50	1000 Volts.
22 Kv. &	500 M Ω	250	125	65	2500 Volts.
33 Kv.					

(3) Ratio Test: 400 V. should be applied to H.T. side and voltage to be measured on L.T. side. The ratio should compare with the rated figures,
(4) Oil level: Oil level should be checked up and topped if necessary.
(5) Breather: The silica in the breather should be blue.
(6) Diaphram : It should be in tact, and no crack is observed.
(7) Measurement of earth resistance: - This should be less than 1.0 ohm.

TABLE-18
DISTRIBUTION TRANSFORMERS FUSE RATING

Capacity In KVA	Size of T.C., Fuse SWG 22 KV	11KV	400V
25	38	38/35	21
50	38	33/30	18 or 2 of 20
75	35	33/28	2 of 20 or 2 of 18
100	35	32/26	2 of 18 or 2 of 16
200	32	26/24	2 of 15

Temperature rise limits for oil immersed type transformers
(BS 171 – 1959)

	Oil Circulation	Cooling	Type Letters	Temperature Rise centigrade Degrees
Windings (Measured by resistance)	Natural thermal head	Air natural	ON	60° C
		Air Blast	OB	
		Water	OW	
	Forced by pump	Air natural	OFN	
		Air Blast	OFB	65° C
		Water	OFW	70° C
Oil (Measured by thermometer)		All		50° C
Cores.	Cores shall be designed so that the temperature rise on any part of external surface does not exceed that of the windings.			

TABLE – 19-A

TRANSFORMER OIL (Grade) – B.30 B.S. 148

Characteristic	Limit
Sludge formation (maximum)	0.3 %
Viscosity at 15.5°C....	200 Redwood seconds
Moisture	Nil
Dielectric strength	30 KV at 15 °C to 20 °C, using 1/3 mm. Diameter sphere, 4 mm. apart
Flash point (Minimum)	145 °C
Evaporation (Maximum)	1.6 %
Cold test	-30 °C
Acidity (Neutralization value)	
Inorganic	Nil
Organic (Max)	0.5 mg KoH / gram of oil

Limits for acidity of Transformer Oil

1. When the acidity is less than 0.2 Mg/KOH/Gm. of oil, the oil is in good condition from the stand point of this test.
2. When the acidity is between 0.2 mg. and 0.5 Mg/KOH/gm, no action needs to be taken, if the oil is satisfactory in all other respects.
3. When the acidity is between 0.5 to 1.0 Mg/KOH/gm the oil should be kept under observation and filtered if necessary.
4. When the acidity exceeds 1 Mg/KOH/gm the oil should be reclaimed or discarded.

TABLE – 19-B

Maximum Allowable Power Transformer Losses

Maximum Allowable losses for Dry type distribution transformer with highest voltage for equipment 24kV at 50% and 100% of the load			Maximum Allowable losses for Dry type distribution transformer with highest voltage for equipment 36kV at 50% and 100% of the load		
Transformer Capacity KVA	Maximum Allowable Losses at 50% KVA or Load	Maximum Allowable Losses at Full load / Rated KVA	Transformer Capacity KVA	Maximum Allowable Losses at 50% KVA or Load	Maximum Allowable Losses at Full load / Rated KVA
100	1.88 %	2.44 %	100	1.04 %	1.8 %
160	1.61 %	2.07 %	160	0.96 %	1.38 %
200	1.50 %	1.90 %	200	0.93 %	1.35 %
250	1.36 %	1.73 %	250	0.89 %	1.27 %
400	1.19 %	1.51 %	400	0.79 %	1.12 %
500	1.12 %	1.45 %	500	0.75 %	1.05 %
630	1.06 %	1.40 %	630	0.70 %	0.99 %
1000	0.90 %	1.20 %	1000	0.70 %	0.98 %
1600	0.79 %	1.08 %	1600	0.65 %	0.98 %
2000	0.75 %	1.00 %	2000	0.64 %	0.98 %

Table No. 20
Safety & Protection Standards

First Number Degree of Protection against accidental contact / contact with external elements			Second Number Degree of Protection against ingress of moisture		
First Number	Description	Explanation	Second Number	Description	Explanation
0	Non-Protected	Not Protected			
1	Hand Protected	Protected against solid object exceeding 50mm in diameter	0	Non-Protected	Not Protected against moisture
2	Finger Protected	Protected against finger contact with live parts; against solid object exceeding 12mm in diameter	1	Drip-Proof against vertical water drops	Water drips falling vertically shall have no harmful effect
3	Tools Protected	Protected against contact with live parts by tools, wire or similar object over 2.5mm thick; protection against penetration of solid object exceeding 2.5mm in diameter	2	Drip-Proof when titled at angles up to 15^0	Water drips shall have no harmful effect
4	Wire Protected	Protected against contact with live parts by tools, wire or similar objects over 1 mm thick; protection against penetration of solid objects exceeding 1mm in diameter.	3	Rain / Spray Proof	Water falling at an angle of up to 60^0 shall have no harmful effect.
5	Dust Accumulation Protected	Complete protection against contact with live parts and against harmful accumulation of dust; some dust may penetrate but not to the extent that operation is impaired	4	Splash proof	Splashing water from any direction shall have no harmful effect
6	Dust Penetration Protected	Complete protection against contact with live parts and against penetration of dust	5	Jet Proof	Water projected by a nozzle from any direction shall have no harmful effect (Nozzle dia. 6.3mm, pressure 30 kmPa)
			6	Jet-Proof	Water projected by a nozzle from any direction shall have no harmful effect (Nozzle dia.12.5 mm pressure 100 kPa)
			7	Watertight	Watertight, tempoeary immersion in water under specified conditions of pressure and time possible without ingress of water in harmful quantities
			8	Pressure watertight	Pressure watertight; continuous submission in water under specified conditions of pressure and time without ingress of water in harmful quantities.

PLANNING GUIDE FOR DIMENSIONS MINIMUM CIVIL DIMENSIONS												
WIDE CABIN - SIDE OPENING AUTOMATIC DOORS										UNIT- mm		
CAPACITY		SPEED	CAR INSIDE		ENTRANCE		LIFT WELL	PIT	O/H	MACHINE ROOM		
Pax	Load (Kg)	m/sec	Width x Depth	Height	Width	Height	Width x Depth			Width	Depth	Height
4	300	0.65 to 1	1050 x 735	2150	700	2000	1450 x 1300	1600	4500	2600	3550	2500
5	375		1100 x 875	2150	750	2000	1500 x 1400	1600	4500	2600	3550	2500
6	450		1100 x 1000	2150	750	2000	1500 x 1525	1600	4500	2600	3550	2500
7	525		1200 x 1000	2150	800	2000	1600 x 1525	1600	4500	2800	3750	2500
8	600		1300 x 1100	2150	800	2000	1700 x 1625	1600	4500	2800	3750	2500
9	675		1300 x 1200	2150	800	2000	1700 x 1725	1600	4500	2800	3750	2500
10	750		1350 x 1300	2250	900	2100	1750 x 1850	1800	4800	2800	4000	2500
11	825	1 to 1.5	1400 x 1400	2250	900	2100	1800 x 1950	1800	4800	2850	4000	2500
12	900		1850 x 1100	2250	1100	2100	2250 x 1675	1800	4800	3500	4000	2500
13	975		2000 x 1100	2250	1200	2100	2425 x 1675	1800	4800	3500	4000	2500
14	1050		2000 x 1200	2250	1200	2100	2425 x 1775	1800	4800	3500	4000	2500

NARROW CABIN - SIDE OPENING AUTOMATIC DOORS										UNIT - mm		
CAPACITY		SPEED	CAR INSIDE		ENTRANCE		LIFT WELL	PIT	O/H	MACHINE ROOM		
Pax	Load (Kg)		Width x Depth	Height	Width	Height	Width x Depth			Width	Depth	Height
12	900	1.5 to 2.5 m/sec.	1200 x 1700	2250	900	2100	1775 x 2325	1800	4800	2900	4000	2500
13	975		1200 x 1800	2250	900	2100	1775 x 2425	1800	4800	2900	4000	2500
14	1050		1250 x 1800	2250	900	2100	1775 x 2425	1800	4800	2900	4000	2500
16	1125		1400 x 1800	2250	1000	2100	1925 x 2425	2200	5500	2900	4000	2500
18	1200		1400 x 2000	2250	1000	2100	1925 x 2625	2200	5500	2900	4000	2500
20	1275		1500 x 2000	2250	1000	2100	2100 x 2625	2200	5500	3000	4000	2500

TABLE 21
Ventilation Requirements, CFM (Liters/s) Per Person

Application	Smoking	Recommendation Cfm	Liters/s
Small stores or	None	10-15	5-7
Shops	Some	30	14
Department Stores	None	7.5-10	3.6-5
Hotel Rooms	Heavy	25-30	12-14
Residential	Some	20-30	9-14
General Office	Some	10-15	5-7
Private Office	None	15-25	7-12
	Heavy	25-30	12-14
Meeting or Board Rooms	Heavy	30-50	14-24
Restaurants or Bars	Some	10-15	5-7
Theatres	None	5-7.5	2.4-3.6
	Some	10-15	5-7
Hospital Wards	None	20-30	9-14
Laboratories	Some	15-20	7-9
Factories	None	7.5-10	3.6-5

Notes:
(1). The above recommendations must be considered in the light of local regulations.
(2) Some applications may be governed by exhaust systems.

TABLE - 22

Flush Type Supply Air Diffusers with dampers – Rating Chart.

Velocity	750 fpm			1000 fpm			1250 fpm			1500 fpm		
Pressure Drop	0.035" w.g.			0.062" w.g			0.100" w.g.			0.14" w.g.		
Nominal Size	Air Qty cfm	Throw ft. 150 fpm Term Vel.	Throw ft. 100 fpm Term Vel	Air Qty cfm	Throw ft. 150 fpm Term Vel.	Throw ft. 100 fpm Term Vel	Air Qty cfm	Throw ft. 150 fpm Term Vel.	Throw ft. 100 fpm Term Vel	Air Qty cfm	Throw ft. 150 fpm Term Vel.	Throw ft. 100 fpm Term Vel
9" dia.	---	--	--	155	4.0	4.7	200	5.0	5.9	235	6.0	7.2
12 " dia.	180	--	4.4	240	4.9	5.8	300	6.1	7.3	365	7.6	8.9
15" dia.	275	4.6	5.4	365	6.0	7.2	450	7.7	9.0	560	9.2	11.0
18" dia.	430	5.7	6.7	580	7.7	9.0	725	9.5	11.2	870	11.6	13.7
21" dia.	600	6.8	8.0	825	9.2	11.0	1030	11.3	13.3	1250	14.0	16.5

These sizes should be considered as standard and as far as possible only these should be used.

Notes for using Supply Air Diffusers Rating Chart:

1. The Terminal Velocity should be selected according to the usage of space to be conditioned. 10c fpm is recommended for most of the normal applications viz. Offices, residences, hotel bedrooms, hospitals etc. 150 fpm is recommended for general offices, restaurants, departmental stores, theatres, etc. Higher than 150 fpm is only recommended for industrial applications.
2. If throw in either direction is not equal, the long side throw should not exceed 1½ times of the short side.
3. Minimum ceiling height: As a general rule the actual throw in any direction should not exceed 1½ times the mounting height i.e. maximum coverage in any direction 3 times the mounting height.
4. The jet velocity is limited by the sound generated by the diffuser. Lower velocity should be used in applications critical from noise point of view. (1250 fpm maximum for private offices etc. and 1500 fpm. Maximum for general offices, departmental stores, etc.)
5. Air quantity cfm available with full step-down diffusers-about 20% more than figures specified above.
   Air quantity cfm available with half step-down diffusers- about 10% more than figures specified above.
6. Equivalent square diffuser size would be one size higher than the round diffuser elected as per the above chart e.g., equivalent of a 12" dia. Diffuser would be 15" X 15" square diffuser.

TABLE - 23

Notes for using supply Air Grilles Rating Chart

1. The chart is for use with cooling applications only and for flat cooling with front louvres set to deflect the air upward towards the ceiling.
2. Vane setting & divergent blow - 22 ½ ^{0} Vane setting indicates the vertical louvres straight forward in the centre, with uniformly increasing angular deflection to 22 ½ ^{0} at each end.
3. Blow indicates distance from outlet to the point where the air stream is substantially dissipated. It is no always necessary to blow the entire length of the room unless there are heat load sources at that end. With uniformly distributed room heat load, the outlet blow should cover 75% of the room length.
4. Minimum Ceiling height is the minimum clear height under the lowest beam of construction which is required for satisfactory operation of the grille. Preferably the top of the grille should be no loss than twice the grilles height below the actual clear height.
5. Cfm / Sq.ft. outlet wall area is the standard for judging total room air movement. The calculated cfm/sq. ft. should lie between the limits shown for the velocity located.
6. The net grill velocity is limited by the sound generated by the outlet. The recommended outlet velocity that results in acceptable sound levels for various types of applications are listed below:

Broadcast Studies	300-500 fpm
Residences, Hotel, Bedrooms, Private Offices & Theatres	500-750 fpm
Cinema, Halls, General Offices	Up to 1000 fpm
Departmental Stores	Up to 1500 fpm

TABLE – 24

Typical mV drop values for Joints

Sr. No.	Type of Joints	Test Current	Max. mV permissible	Good mV
1	Terminal to Link	100	2.5	0.5-1.0
2	Terminal to Lug	50	8.0	1.0-2.0
3	Terminal to Lug	100	5.0	1.0-2.0
4	Cable to Cable lug (Crimped Joint)	Rated	5.0	2.0

1. For Correct Cable Lugs
   a. The conductor should be fully accommodated within lug
   b. The cable lug should have a close fit as possible to the conductor.
2. Crimping Joints
   a. Length of insulation to be stripped = barrel length + 1-3mm
   b. For cable size of 35 mm2 & above two / three clamps are recommended @ 3-4 mm distant

TABLE - 25
Parameters for air conditioning

Sr. No.	Particulars
1	For AHU 400 cfm per TR of Cool supply air shall be considered
2	Qty of Cooling water reqd. to be circulated through shall & tube condenser 3.5 to 4 gpm per ton.
3	a. 3 gpm per ton Qty of chilled water reqd. through chiller based on 8^0 F temperature different across the chiller shall be considered.
	b. 2.4 gpm per ton Qty of chilled water reqd. through chiller based on 10^0 F temperature different across the chiller shall be considered.
4	Fouling factor = 0.0005 ft^2 hr (For chiller closed system = 0.001 ft^2 hr F /bton) For Condenser water)
5	Normal comfort conditions for air conditioning $78^0 \pm 2^0$ F temp % 50% to 60% R.H.
6	Fresh air requirement 8 to 10 cfm / person or 1.5 air change per hr. whichever is higher.
7	Heat Load 150/200 sq.ft. / TR for unexposed 100/150 Sq. ft/TR for exposed 10 persons / TR for auditorium / Cinema
8	Power consumption for air conditioning 1 BHP /ton for compressor + ½ BHP/ton for fan motor, pump motor, cooling tower etc..

TABLE - 26
Basis of Design for Air Conditioning

Conditions	D.B.	W.B.	% R.H.	D.P.	Gr/Ft.	Enthalpy
Outside – Summer	110	78	24	65	93	40.60
Monsoon	90	85	82	84	176	47.90
Inside (Room)	76	64	55	58.7	73.71	29.78
Difference	34				19.29	10.82

TABLE - 27

Fluorescent Lamp			HPSV (SON) Lamps			Compact Fluorescent/		
Watt	Luminous Flux	Color Temp.	Watt	Luminous Flux	Color Temp.	Watt	Luminous Flux	Color Temp.
20 W	1160 970	4300^0 K 6500^0 K	70W	5800		7W	400	2700^0 K 6500^0 K
40 W	2770 2450	4300^0 K 6500^0 K	150W	13500		9W	600	2700^0 K 6500^0 K
			250W	26000		11W	900	2700^0 K 6500^0 K
						18 W	1200	2700^0 K 6500^0 K
Halogen Lamps			**HPMV Lamps**			**Incandescent Lamp**		
300W	5100		80 W	3500		40 W	425	
500 W	9000		125 W	6250		60 W	720	
1000W	22000		250 W	13500		100 W	1380	
			400 W	23000		500 W	8200	

The average illumination level (lux) on any surface per unit area is calculated as below

Illuminance (Lux) = $\frac{\text{No. of fittings x Lux output of each x MF X COU}}{\text{Area}}$

Where M.F = Maintenance factor depends on (a) dust setting on tube / lamp & reflector
(b) wall & surface color
© Depreciation of luminaries floor

C.O.U = Co-efficient of utilization i.e., %age light reaches on the working place directly as well as effects from wall & ceiling to contribute as useful illuminance depends on (a) Shape & mounting light of the luminaries
(b) Shape & dimension of room to be illuminated
© Reflection of the ceiling / walls & the floor

TABLE - 28		
Rating Conditions of Hermetic Sealed Refrigerant System		
High Temp.	Normal	High

Ambient Temp.	35° C (95° F) DB	46° C DB
Evaporating Temp.	7.2° C (45° F)	C (55° F)
Condensing Temp.	55° C (131° F)	
Liquid Temp.	46° C (115° F)	
Suction Gas Temp.	35° C (95° F)	
Max. Suction Pressure	5.4Kg / Cm^2 (76 PSIG)	6.3Kg / cm^2 (90 PSI)
Max. Discharge Pressure	21.1 Kg/Cm^2 (300 PSIG)	28.1 Kg/Cm^2 (400 PSI)
	Indoor	Outdoor
Normal Ambient	27° C D.B., 19° C W.B.	35° C D.B., 30° C W.B.
High Ambient	35° C D.B., 27° C W.B.	46° C D.B., 27° C W.B.

Rated Conditions of Water Cooler

	Designed	Actual
Ambient Temp.	35° C	45° C
Water inlet Temp.	32° C	42° C
Water outlet Temp.	17° C	25° C

As the temp. of the comfortable drinking water is 16° to 18° C, the capacity of water cooler reduces by 70% @ 45° C ambient temp. i.e., 150 ltr. / hr. gives 100 ltr. / hr. cooling water (600 glass / hr.)

ECBC RECOMMENDED LOSSES FOR OIL COOLED TRANSFORMER

Rating kVA	Max. Losses at 50% loading kW	Max. Losses at 100% loading kW
	Up to 11 kV	
100	0.5	1.8
160	0.8	2.2
200	0.9	2.7
250	1.1	3.3
315	1.1	3.6
400	1.5	4.6
500	1.6	5.5
1000	2	6.6
1250	3	9.8
1450	3.6	12
1600	4.5	15
2000	5.4	18.4
2500	6.5	22.5

Transformer neutral and body earthing

1.0 One of the frequently asked questions by field engineers is regarding transformer neutral / body earthing. The requirement strictly as per IE rules 1956 – 2000 update is given below

2.0 Cl.67 Connection with earth

(a) The neutral point of every generator and transformer shall be earthed by connecting it to the earthing system as defined in Rule 61(4) and herein above by not less than two separate and distinct connections.

3.0 Cl.61 Connection with earth

3.1 Cl.61 (2) The frame of every generator, stationary motor, portable motor, and the metallic parts (not intended as conductors) of all transformers and any other apparatus used for regulating or controlling energy and all medium voltage energy consuming apparatus shall be earthed by the owner by two separate and distinct connections with earth.

3.2 Cl.61 (4) All earthing system shall

A consist of equipotential bonding conductors capable of carrying the prospective earth-fault current and a group of pipe/rod/plate electrodes for dissipating the current to the general mass of earth without exceeding the allowable temperature limits as per relevant Indian Standards in order to maintain all non-current carrying metal works reasonably at earth potential and to avoid dangerous contact potentials being developed on such metal works

B Limit earth resistance sufficiently low to permit adequate fault current for the operation of protective devices in time and to reduce neutral shifting

C be mechanically strong, withstand corrosion and retain electrical continuity during the life of the installation. All earthing systems shall be tested to ensure efficient earthing, before the electric supply lines or apparatus are energised.

From the above it is pertinent to clarify the following:

IE rules do not demand two independent earth pits for transformer neutral and two independent earth pits for body earthing of transformer tank as popularly understood.

As per IE rules two independent (separate) connections to earthing grid shall be provided from neutral of transformer and body of transformer tank. Earthing grid itself will be formed by a number of vertical electrodes and all interconnected by horizontal electrodes. The over all earth grid resistance must be less than 5 ohms.