**ANNEXURE-II**

**Erection, Commissioning and Testing of Test Plant Equipments and Upgradation of UHV Test Plant In Bl-III**

**SCHEDULE OF RATES**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SR NO** | **Description of work** | **Qty.** | **UOM** | **Rate in INR** | **HSN/SAC Code** | **GST in %** | **GST in INR** | **Rate incl of GST in INR** | **Amount excluding GST in INR** |
| **1** | **450 MVA TRANSFORMER** | | | | |  |  |  |  |
| **1.1** | Erection of 245 kv solid core post insulators | 50 | Nos. |  |  |  |  |  |  |
| **1.2** | Laying of new Cooling Water Pipeline for 15 MVA Generator and Transformer | 300 | mtrs |  |  |  |  |  |  |
| **1.3** | Supply of MS Flanges, size 150 NB confirming to ASA 150 with raised face, | 100 | Nos |  |  |  |  |  |  |
| **1.4** | Installation of MS Flanges, size 150 NB confirming to ASA 150 with raised face, | 100 | Nos |  |  |  |  |  |  |
| **1.5** | Supply of MS Flanges, size 200 NB confirming to ASA 200 with raised face, | 100 | Nos |  |  |  |  |  |  |
| **1.6** | Installation of MS Flanges, size 200 NB confirming to ASA 200 with raised face | 100 | Nos |  |  |  |  |  |  |
| **1.7** | Construction of New Earth Pits for power Earthing with material in Bay-8,BL-III. | 20 | Nos |  |  |  |  |  |  |
| **1.8** | Supply of GI Flat, 75 mm x10 mm | 2000 | mtr |  |  |  |  |  |  |
| **1.9** | Supply of GI Flat, 50 mm x10 mm | 1000 | mtr |  |  |  |  |  |  |
| **1.10** | Supply of control cable with numbering ferules & cu lugs of required size proper dressing & binding with tape etc. 4C X 2.5 sq.mm | 2000 | Nos |  |  |  |  |  |  |
| **1.11** | Termination of control cable 4C X 2.5 sq.mm | 2000 | Nos |  |  |  |  |  |  |
| **1.12** | Supply of control cable with numbering ferules & cu lugs of required size proper dressing & binding with tape etc. 7C x 2.5 sq.mm. | 2000 | Nos |  |  |  |  |  |  |
| **1.13** | Termination of control cable 7C x 2.5 sq.mm. | 2000 | Nos |  |  |  |  |  |  |
| **1.14** | Supply of Relay Panels for 11/90 kv,13.33 MVA,Single phase (03 Nos) Transformer | 03 | Nos |  |  |  |  |  |  |
|  | Erection and commissioning of Relay Panels for 11/90 kv,13.33 MVA,Single phase (03 Nos) Transformer | 03 | Nos |  |  |  |  |  |  |
| **CAPACITOR BANK** | | | | | |  |  |  |  |
| **2.1** | Shifting,Assembly,Erection & commissioning of outdoor type 2 Nos. 156 KV,3 phase, 2000 amp 190 MVAR capacitor banks. | 2 | Nos |  |  |  |  |  |  |
| **2.2** | Supply of Outdoor Polymer Surge Arrestors  Rated Voltage (Ur) (kVrms) =150  Nominal Discharge Current (kAcrest) = 10 | 6 | Nos |  |  |  |  |  |  |
| **2.3** | Shifting, Erection and Commissioning of Outdoor Polymer Surge Arrestors  Rated Voltage (Ur) (kVrms) =150  Nominal Discharge Current (kAcrest) = 10 | 6 | Nos |  |  |  |  |  |  |
| **2.4** | Shifting erection & commissioning of outdoor type 156 kv 3 nos. Voltage transformer | 3 | Nos |  |  |  |  |  |  |
| **2.5** | Busbar Connections 4 ″ IPS(EH) Aluminum Tubular busbar,dia=114.2 mm | 300 | mtr |  |  |  |  |  |  |
| **2.6** | Erection of suitable support structures for above tubular busbars | 1 | job |  |  |  |  |  |  |
| **2.7** | Supply of Bimetallic terminal connectors for Circuit Breaker | 18 | Nos |  |  |  |  |  |  |
|  | Installation of Bimetallic terminal connectors for Circuit Breaker | 18 | Nos |  |  |  |  |  |  |
| **2.7** | Supply of aluminium welding sleeves. | 30 | Nos |  |  |  |  |  |  |
| **2.8** | Installation of aluminium welding sleeves | 30 | Nos |  |  |  |  |  |  |
| **2.9** | Supply of suitable clamps for supporting and holding 4” IPS Aluminium tubular busbars from the solid core post insulators. | 100 | Nos |  |  |  |  |  |  |
| **2.10** | Installation of suitable clamps for supporting and holding 4” IPS Aluminium tubular busbars from the solid core post insulators. | 100 | Nos |  |  |  |  |  |  |
| **2.11** | Supply of TEE Connectors for tube Through, Tube Tee Off . | 20 | Nos |  |  |  |  |  |  |
| **2.12** | Installation of TEE Connectors for tube Through, Tube Tee Off . | 20 | Nos |  |  |  |  |  |  |
| **2.13** | Supply,Erection and commissioning of control and relay panel for capacitor bank | 02 | N0s |  |  |  |  |  |  |
| **2.14** | Erection and commissioning of control and relay panel for capacitor bank | 02 | N0s |  |  |  |  |  |  |
| **2.15** | Dismantling of existing capacitor bank | 02 | N0s |  |  |  |  |  |  |
| **2.16** | Dismantling of control panel for capacitor banks | 02 | N0s |  |  |  |  |  |  |
| **WALL BUSHINGS** | | | | | |  |  |  |  |
| **3.1** | Shifting, Erection and commissioning of 220 kv, 4000 amps wall bushings combined with current transformer with fabrication of all support structure | 8 | Nos |  |  |  |  |  |  |
| **3.2** | Supply of Bimetallic terminal connectors for wall bushings | 16 | Nos |  |  |  |  |  |  |
|  | Installation of Bimetallic terminal connectors for wall bushings | 16 | Nos |  |  |  |  |  |  |
| **VCB PANELS** | | | | | |  |  |  |  |
| **4.1** | Shifting ,Erection and Commissioning of 11 KV VCB panel with 1 nos of 5 panel switchboard breaker , and 1 nos of 2 panel switchboard | 01 | Job |  |  |  |  |  |  |
| **4.2** | Erection and Commissioning of 50 volt battery charger with DCDB panel | 01 | Job |  |  |  |  |  |  |
| **4.3** | Erection and Commissioning of 220 volt battery charger with DCDB panel | 01 | Job |  |  |  |  |  |  |
| **CURRENT TRANSFORMER** | | | | | |  |  |  |  |
| **5.1** | Shifting erection & commissioning of outdoor type 220 kv 2000 amp 6 nos. current transformer | 6 | Nos |  |  |  |  |  |  |
| **5.2** | Supply of Bimetallic terminal connectors for CTs and VTs | 15 | Nos |  |  |  |  |  |  |
| **5.3** | Installation of Bimetallic terminal connectors for CTs and VTs | 15 | Nos |  |  |  |  |  |  |
| **5.4** | Fabrication installation of mounting structure (stands ) for CT,PT , SF6 220 KV breaker, LA ,wall bushing, 220 kv Insulator ,LMS | 1 | Job |  |  |  |  |  |  |
| **11 KV POWER CABLES** | | | | | |  |  |  |  |
| **6.1** | Laying ,Dressing and Clamping of H.T. Power Cable (11 Kv,UE,1Cx 500 sqmm) | 5000 | mtr |  |  |  |  |  |  |
| **6.2** | Laying ,Dressing and Clamping of H.T. Power Cable (11 Kv,UE,1Cx 300 sqmm) | 500 | mtr |  |  |  |  |  |  |
| **6.3** | Termination of 11kV(UE) XLPE 1C x 500 sq mm cable | 400 | Nos |  |  |  |  |  |  |
| **6.4** | Supply of 11kV(UE) XLPE 1C x 300 sq mm cable Termination Kits | 25 | Nos |  |  |  |  |  |  |
| **6.5** | Termination of 11kV(UE) XLPE 1C x 300 sq mm cable | 25 | Nos |  |  |  |  |  |  |
| **15 MVA MG SET** | | | | | |  |  |  |  |
| **7.1** | Unloading, Shifting and Erection of 15 MVA Alternator with 4MW AC Motor along with associated equipments and accessories such as VFD,Static excitation equipment ,interposing transformers, winding change over cubicles etc and auxiliaries like HP and LP lubricating System, cooling system etc.  Weight of 15 MVA generator is 67 MT apprx and motor is 8 MT.Mobiliztion charges for crane.Installtion of equipments on foundation. . The MG Set has to be skidded or moved on rollers/pipes into osition.Dragging of MG set to distance of 10 meters by chain and pulley.  Unloading,Shifting,Erection and Commissioning of 450 MVA,70/1000 KV, 3phase Testing Transformer. | 1 | Job |  |  |  |  |  |  |
| **7.2** | Supply of 245KV, 3 pole Outdoor SF6 gas filled circuit breakers of 3150 Amp. normal current rating & 40 KA for 3 sec. short time current rating complete with various accessories & supporting structures .Must be suitable for Capacitor Switching | 3 | Nos |  |  |  |  |  |  |
| **7.3** | Shifting, Erection and Commissioning of 245KV, 3 pole Outdoor SF6 gas filled circuit breakers of 3150 Amp. normal current rating & 40 KA for 3 sec. short time current rating complete with various accessories & supporting structures | 3 | Nos |  |  |  |  |  |  |
| **7.4** | Supply,Fabrication & Erection and Commissioning of Isolator Panels for housing 12 kV, 2000 A, 3 phase Isolators (4 nos.) as per site requirement (with supply of material cu bus bar,HT insulator , HT sleeve ) | 04 | Nos |  |  |  |  |  |  |
|  | Erection and Commissioning of Isolator Panels for housing 12 kV, 2000 A, 3 phase Isolators (4 nos.) as per site requirement (with supply of material cu bus bar,HT insulator , HT sleeve ) | 04 | Nos |  |  |  |  |  |  |
| **7.5** | Shifting ,Erection and Commissioning of 1000 KVA,11/.415 Kv Transformer. | **1** | **No** |  |  |  |  |  |  |
| **7.6** | Construction of electronic equipment earth pit with complete material. | 10 | Nos |  |  |  |  |  |  |
| **7.7** | Installation of Perforated / ladder cable trays complete in all respects along with their supporting/fixing arrangements | 500 | mtr |  |  |  |  |  |  |
| **7.8** | Supply of MS Anchor Fasteners | 200 | Nos |  |  |  |  |  |  |
| **7.9** | Supply of 1100 Volt Grade, 1C X 300 sq.mm LT Power Cables | 500 | mtr |  |  |  |  |  |  |
|  | Laying, dressing and clamping of 1100 Volt Grade, 1C X 300 sq.mm LT Power Cables | 500 | mtr |  |  |  |  |  |  |
| **7.10** | Supply of LT Power Cable Termination Kits ,1C x 300 sq mm cable . | 100 | Nos |  |  |  |  |  |  |
| **7.11** | Termination of LT Power Cable 1C x 300 sq mm cable . | 100 | Nos |  |  |  |  |  |  |
| **7.12** | Supply of 1100-volt grade conductor (FRLS / AYWY) armoured Control cable .4C X 2.5 sq.mm. | 3000 | mtr |  |  |  |  |  |  |
| **7.13** | Laying dressing and clamping of 1100 volt grade conductor (FRLS / AYWY) armoured Control cable along cable trenches, trays etc. including de-watering and cleaning of trenches etc. as required.4C X 2.5 sq.mm. | 3000 | mtr |  |  |  |  |  |  |
| **7.14** | Supply of 1100 volt grade conductor (FRLS / AYWY) armoured Control cable  .7C x 2.5 sq.mm. | 3000 | mtr |  |  |  |  |  |  |
| **7.15** | Laying dressing and clamping of 1100 volt grade conductor (FRLS / AYWY) armoured Control cable along cable trenches, trays etc. including de-watering and cleaning of trenches etc. as required.7C x 2.5 sq.mm. | 3000 | mtr |  |  |  |  |  |  |
| **7.16** | Laying and termination of Profibus Communication Cable. Drawing of Cable in GI pipes of 100 NB dia. | 3000 | mtr |  |  |  |  |  |  |
| **7.17** | Laying of Copper Shielded Cables. | 3000 | mtr |  |  |  |  |  |  |
| **7.18** | Supply of Termination kits of shielded cable 2C X 1.5 sq. mm | 2000 | Nos |  |  |  |  |  |  |
| **7.19** | Termination of shielded cable 2C X 1.5 sq. mm | 2000 | Nos |  |  |  |  |  |  |
| **7.20** | Laying, fitting and fixing 100 mm dia. GI pipes, medium class with all necessary accessories like socket, bend, tee, union, cross, short piece, etc. fitted with holder bat clamps, including cutting pipes, making threads, fittings, fixing, etc. complete in all respects, including jointing materials in position above ground. | 500 | mtr |  |  |  |  |  |  |
| **7.21** | Supply of MCB Distribution Boards 6 way,TPN,12 W,I/C+O/G=8+18 Neutral Links | 03 | nos |  |  |  |  |  |  |
| **7.22** | Shifting, erection and commissioning of MCB Distribution Boards 6 way,TPN,12 W,I/C+O/G=8+18 Neutral Links | 03 | nos |  |  |  |  |  |  |
| **7.23** | Supply of MCB Distribution Boards MCB distribution boards 12 way,TPN, with bus bar of 200 amps. Rating dully fitted with "c" series, TP MCBs of 32 amps rating (12 nos.)10 ka breaking capacity. | 06 | Nos |  |  |  |  |  |  |
| **7.24** | Shifting, erection and commissioning of MCB Distribution Boards MCB distribution boards 12 way,TPN, with bus bar of 200 amps. Rating dully fitted with "c" series, TP MCBs of 32 amps rating (12 nos.)10 ka breaking capacity. | 06 | Nos |  |  |  |  |  |  |
| **7.25** | Supply of MCB Distribution Boards MCB distribution board horizontal type ,16 way with neutral link ,single phase, with busbar fitted with 1no isolator four pole 63 amp ,8 no MCB single pole 10 amp and 4 no MCB single pole 16 amp. | 06 | Nos |  |  |  |  |  |  |
| **7.26** | Shifting, erection and commissioning of MCB Distribution Boards MCB distribution board horizontal type ,16 way with neutral link ,single phase, with busbar fitted with 1no isolator four pole 63 amp ,8 no MCB single pole 10 amp and 4 no MCB single pole 16 amp. | 06 | Nos |  |  |  |  |  |  |
| **7.27** | Supply of MCB Distribution Boards 8 way 415 Volts AC TPN double door Distribution board with powder coated sheet steel enclosure complete with busbars, neutral links, DIN channels, 08 nos. of 4 amps ,3 pole MCB with 10 KA breaking capacity. Incomer MCB shall be 63 amps with 20 kA breaking capacity. | 06 | Nos |  |  |  |  |  |  |
| **7.28** | Shifting, erection and commissioning of MCB Distribution Boards 8 way 415 Volts AC TPN double door Distribution board | 06 | Nos |  |  |  |  |  |  |
| **7.29** | Supply of LT ACB PANELS, Designing, engineering, manufacture, supply installation, commissioning and testing of pedestal amount, LT ACB panel, out of 2 mm CRCA steel sheet, dust & vermin proof, duly painted with red oxide & power coated with steel grey pain after pretreatment of acid/alkali wash with a provision for incoming side cable entry & outgoing bottom cable entry. The panel shall comprise of 2000 Amps. Capacity copper bus bar. The bus bars shall be insulated by heat shrinkable P.V.C. sleeves of R.Y.B.  Rating: 2000 Amps  No. of poles: 4  Type of breaker: Air Break Type, Manually operated Draw out type  Voltage rating:415 V AC, at 50 HZ  Insulation voltage (main ckt):1250 Volts  Insulation voltage (control ckt):415 Volts  Impulse with stand Voltage (KV):12  Type of test: Combined sequence.  Routine test: To be carried out  Test certificate with breaker  Copy of combined sequence test & type test to be provide along with the breaker  Rated breaking capacity,Ics=Icu=Icw,75 KA RMS.Each ACB panel shall have 6 nos of output feeders with 200 amps MCCB  Rating: 200 Amps, No of Poles: 3/4, Manually operated draw out type  Voltage rating: 415 V AC at 50 HZ.Insulation Voltage (main ckt) 690 Volts T ACB Panels. | 03 | Nos |  |  |  |  |  |  |
| **7.30** | Erection and commissioning of LT ACB PANELS. | 03 | Nos |  |  |  |  |  |  |
| **7.31** | Supply of Relay Panels for 15 MVA AC Generator | 01 | No |  |  |  |  |  |  |
| **7.32** | Erection and commissioning of Relay Panels for 15 MVA AC Generator | 01 | No |  |  |  |  |  |  |
| **7.33** | Supply of Remote I/O Panel with TFT LCD 46” screen display Mimic Panel,Laptop based programming unit and printer | 01 | Lot |  |  |  |  |  |  |
| **7.34** | Erection and commissioning of Remote I/O Panel with TFT LCD 46” screen display Mimic Panel,Laptop based programming unit and printer.(SR NO 7.33) | 01 | Lot |  |  |  |  |  |  |
| **7.35** | Developing the PLC and SCADA. .Programming the sequence of operations, control loops, timing, operational and safety interlocks, building a high level of self-diagnostic features etc. in the PLC as per the site requirements | 01 | job |  |  |  |  |  |  |
| **7.36** | Supply of  WINDING CHANGE OVER CUBICLE.  Suitable for 15 MVA 11 Kv AC Generator.  System Voltage:11 kV 50/60 Hz Ac 3 Phase  Rating of Converter:15 MVA  No of Input Terminals:12  Modes of Operation:4--Star Parallel,Star Series, Parallel Delta andDelta Series.  Mode Selection:Through Interlocked load break Switches(to be done on no load before energizing the generator)  Indicating Lamps:04 nos for mode indications 110 volts LEDs  CTs and PTs :Class 0.1,cast resin ,3 nos of 1 phase units.  Metering:AC Voltmeter and AC Ammeter  Cable Entry From Bottom  Enclosure:IP54  Mounting: Floor Mounting  Power Terminations :Suitable for 11 kV XLPE Single Core Power cables  Outgoing Terminations 3 nos :Suitable for 11 kV XLPE Single Core Power cables  Mechanical Interlock: Provided to permit operation in any one mode only  Gland Plates: Undrilled Gland Plate detachable from bottom  Bus bars: Aluminium  Earthing Provisions: Two Independent earthing Terminals provided. | 01 | No |  |  |  |  |  |  |
| **7.37** | Erection and Commissioning of WINDING CHANGE OVER CUBICLE.  Suitable for 15 MVA 11 Kv AC Generator.  System Voltage:11 kV 50/60 Hz Ac 3 Phase  Rating of Converter:15 MVA  No of Input Terminals:12  Modes of Operation:4--Star Parallel,Star Series, Parallel Delta andDelta Series.  (SR NO 7.36). | 01 | No |  |  |  |  |  |  |
| **7.38** | Supply of 3Ph/1Ph SELECTION PANEL  System Voltage:11 kV 50/60 Hz Ac 3 Phase  CTs:Core 1,3000/5,Class 1,Cast Resin,3 nos  Bus bars: Aluminium  No of Buses:3  Cable Entry: Bottom  Protection:IPX4  PTs:6350/63.5 V,1 Ph,3 nos  Metering: Voltage Current and Frequency  Indications: Single phase and Three Phase Indication  Function ;To connect generator winding in either 3 phase star mode or single phase zigzag mode  Phase Selection: Two Position, Single Pole Two nos Load Break Switch with common Handle 11 kV 3000 Amps.  Accessories:LEDs,HRC Fuse, Ammeter Selector Switch | 01 | No |  |  |  |  |  |  |
| **7.39** | Erection and Commissioning of 3Ph/1Ph SELECTION PANEL System Voltage:11 kV 50/60 Hz Ac 3 Phase (SR NO 7.38) | 01 | No |  |  |  |  |  |  |
| **7.40** | Supply of LT MOTOR CONTROL CENTRE PANELS:  1)INCOMER PANEL 01 NO CONSISTING OF :-  1.1) TPN Fuse Switch Unit with Auxiliary, 500 Amps ,Qty=01 no.  1.2) 500 A HRC Fuse, 500 Amps, Qty=03 no.  1.3) RYB Indicating Lamps, Qty=03 no.  1.4) On / off Indicating Lamp, Qty=02 no  1.5) 96 Sq.mm Multi-function Meter, Accuracy Class=1.0 with following Parameter Display :-  i)Voltage R,Y,B,RN,BN,YN,  ii)Current RYB  iii)Frequency  iv) Power factor R, Y, B  v) Watt W1, W2, W3  vi)Watt hours  vii) Run Hours  Qty=01 no  1.6) Resin Cast Transformer, 500/1 amps, Burden – 5/7.5VA, Accuracy Class- 1.0,Qty=03 no  1.7) Control Fuses 6 Amps  BUSBARS:  1) 500 Amp TPN Copper busbars  OUTGOING:  1) 1 No. 200 Amp 415 volts, Four Pole, Moulded Case Circuit Breaker, Breaking Capacity (KA) = 25  2) 1 No. 100 Amp 415 volts, Four Pole, Moulded Case Circuit Breaker, Breaking Capacity (KA) = 25  3) 2 No. 63 Amp, 4Pin (3P+E) 415 volts Plug and Sockets, complete with 2 nos of 415 volts AC ,63 amps TPN MCB, breaking capacity=10 KA.  4) 2 No. 32 Amp, 4 Pin (3P+E) 415 volts Plug and Sockets, complete with 2 nos of 415 Volts AC,32 amps TPN MCB, breaking capacity=10 KA.  5) 2 No 32 amps 3P (1P+E+N), 250 Volts AC Plug and socket, complete with 2 nos of 250 Volts AC 63 amps TPN MCB, breaking capacity=10 KA.  6) PLUG AND SOCKETS:-Specifications: IS 309-3, IEC: 1989. Outer casing made of non-corroding die cast aluminium alloy, interior moulded from superior grade phenolic/polyester compound. Overhang protection against accidental contacts with live parts. The earth connection makes first and breaks last. | 04 | No |  |  |  |  |  |  |
| **7.41** | Erection and Commissioning of LT MOTOR CONTROL CENTRE PANELS.(SR NO 7.40) | 04 | No |  |  |  |  |  |  |
|  | Total Value | | | | |  |  |  |  |

**Dy MGR(FRX)**