



List of Tools & Equipment			
SOLAR TECHNICIAN (ELECTRICAL)(For batch of 20 candidates)			
S No.	Name of the Tools and Equipment	Specification	Quantity
A. TRAINEES TOOL KIT			
1.	Measuring Steel Tape	5 meter	21 (20+1) Nos.
2.	Combination Plier Insulated	200 mm	21 (20+1) Nos.
3.	Screw Driver Insulated	4mm X 150 mm, Diamond Head	21 (20+1) Nos.
4.	Screw Driver Insulated	6mm X 150 mm	21 (20+1) Nos.
5.	Electrician screw driver thin stem insulated handle	4mm X 100 mm	21 (20+1) Nos.
6.	Heavy Duty Screw Driver insulated	5mm X 200 mm	21 (20+1) Nos.
7.	Electrician Screw Driver thin stem insulated handle	4mm X 250 mm	21 (20+1) Nos.
8.	Punch Centre	9mm X 150 mm	21 (20+1) Nos.
9.	Knife Double Bladed Electrician	100 mm	21 (20+1) Nos.
10.	Neon Tester	500 V	21 (20+1) Nos.
11.	Steel Rule Graduated both in Metric and English Unit	300 mm with precision of 1/4th mm	21 (20+1) Nos.
12.	Hammer, cross peen with handle	250 grams	21 (20+1) Nos.
B. SHOP TOOLS & EQUIPMENT			
(i) List of Tools & Accessories			
13.	Electrical Symbol and Accessories Charts		04 nos.
14.	Pipe vice Cast Iron with hardened jaw open type	100 mm	2 Nos.
15.	Hand Vice	50 mm jaw	2 Nos.
16.	Table Vice	100 mm jaw	2 Nos.
17.	Hacksaw frame (with blade)	Adjustable 300 mm Fixed 150 mm	2 Nos. Each
18.	File flat	200 mm 2nd cut with handle	2 Nos.
19.	File half round	200 mm 2nd cut with handle	2 Nos.
20.	File round	200 mm 2nd cut with handle	2 Nos.
21.	Pliers long nose insulated	150 mm	4 Nos.
22.	Pliers flat nose insulated	200 mm	4 Nos.
23.	Pliers, round nose insulated	100 mm	4 Nos.
24.	D.E. metric Spanner Double Ended	6 - 32 mm	2 Set

**Solar Technician (Electrical)**

25.	Gauge, wire imperial stainlees steel marked in SWG & mm	Wire Gauge - Metric	2 Nos.
26.	Portable Electric Drill Machine	0-12 mm capacity 750W, 240V with chuck and key	1 No.
27.	Crimping Tool	1.5 sq mm to 16 sq mm 16 sq mm to 95 sq mm	1 No. Each
28.	Pliers Side Cutting	150 mm	2 No.
29.	Wire stripper adjustable length		2 No.
30.	Hammer, ball peen With handle		2 No.
31.	Scriber (Knurled centreposition)		2 No.
32.	Tool kit Box/bag portable		5 No.
33.	Allen Key		1 Set
34.	Scissors blade	150 mm	2 No.
35.	Electrical loads: set of Incandescent lamp, Tube light, CFL, LED light, Heater and Geyser	Electrical loads: set of Incandescent lamp, Tube light, CFL, LED light, Heater and Geyser	2 Set
36.	Torque wrench	8N-m to 15N-m	1 No.
37.	Pipe Cutter to cut pipes	upto 5 cm. dia	1 No.
38.	Pipe Cutter to cut pipes	above 5 cm dia	1 No.
39.	Try Square	150 mm blade	2 No.
40.	Multi Meter (analog)	0 to 1000 M Ohms, 2V to 500 V,100 microA to 10A DC and AC	1 No
41.	Load Bank (variable)	Up to 1.2 KW (Lamp / heater Type)	1 No.
42.	Wire Cutter and Stripper	150 mm	4 Nos.
43.	Earth Plate	60cm X 60cm X 3.15mm Copper Plate 60cm X 60cm X 6mm GI Plate	1 Each
44.	Earth Electrode	Primary Electrode 2100x28x3.25mm Secondary Cu Strip 20x5mm	1 No.
45.	Out Side Micrometer	0 - 25 mm least count 0.01mm	2 Nos.
46.	Tap set	Different size	02 Set Each
47.	Trolley for Transportation of Batteries		02 Nos.
48.	Die for Threading	Different sizes	02 Set
49.	Rooftop Mounting Structure	For 4 x 250 W solar panels mounting practice, with tilt adjustment	2 Set
50.	Electrical wiring and switch gear rack	Electrical control elements suitable for practice of control circuits using banana plugs and sockets	1 No.
51.	Protective relays and contactors rack	suitable for practice of control circuits using banana plugs and sockets	1 No.



Solar Technician (Electrical)

52.	MCCB	100Amps, Triple pole	1 No.
53.	ELCB and RCCB	25Amps, double pole and 25Amps, double pole, IΔn 30 mA	1 Each
54.	Fuses	HRC Glass Rewire Type	4 Each
55.	Cables: Twisted Pair Nonmetallic Sheathed Cable Underground Feeder Cable Ribbon Cable Metallic Sheathed Cable Multi-Conductor Cable Coaxial Cable Direct-Buried Cable	1 mtr each	1 Each
56.	Solar cable (Red)	5 square mm	As required
57.	Solar cable (Black)	5 square mm	As required
58.	Three core wire	(230 V, 15 A)	As required
59.	Battery cable	7.5 sqmm	As required
60.	Resin cored Solder		As required
61.	Solder wax		As required
62.	MC – 4 connector		As required
63.	pins	5 mm	As required
64.	lugs	7.5 mm	As required
65.	Hacksaw blades	200 mm, 300 mm	As required
66.	Bolts, nuts, anchor bolts, washers, screws, other pins, lugs etc		As required
67.	Civil work utensils	spade, mixing spoon, leveling plates	1 Set
68.	Plumbing tools		1 Set
69.	Plumbing raw materials		As required
70.	Civil work raw materials		As required
(ii) List of Equipment			
71.	Multimeter	Digital 0 to 1000 M Ohms, 2V to 700 V, 100 microA to 10A DC and AC	02 Nos.
72.	Megger	Analog - 500 V	01 Nos.
73.	Hydrometer		04 Nos.



Solar Technician (Electrical)

74.	Solar Insulation meter		02 Nos.
75.	Pyranometer		01 No.
76.	Pyrheliometer		01 No.
77.	Lux meter	Lux meter LCD read out 0.05 to 7000 Lumens with battery.	02 Nos.
78.	Magnetic Flux Meter	0-500 tesla	02 Nos.
79.	Tong Tester / Clamp Meter	0 - 100 A (Digital Type)	01 Nos.
80.	Soldering Iron	25 Watt, 65 Watt and 120 Watt, 230 Volt	02 Nos. Each
81.	Temperature controlled Soldering Iron	50 Watt, 230 Volt	02 Nos.
82.	Thermometer Digital	0° C - 150° C	01 No.
83.	Sun Shine recorder		02 No.
84.	Weather monitoring station	To monitor and record Sunshine, wind velocity, temperature, rainfall etc with software.	01 No.
85.	Solar cell based sunlight radiation meter	For Solar power measurement up to 2000 w/square meter	02 No.
86.	Magnetic compass		04 No.
87.	Cut models of photo voltaic cell assembly		02 Nos.
88.	Cut model of Lead acid battery		01 No.
89.	Lead Acid battery	12V, 40Ah, 75Ah	01 Each
90.	Lead Acid battery	12V, 100 Ah	04 Nos.
91.	Solar simulator for solar cell characteristic study	To study IV curve of a solar cell of minimum 2 watt under variable illumination, temperature and suitable load	01 No.
92.	IV Curve tester		01 No.
93.	Sun path finder		01 No.
94.	Solar energy trainer with grouping of solar cells	To group (series or parallel) at least six solar cells each with minimum 2 W with suitable loads	01 No.
95.	Solar tracker demonstrator kit	To study manual and automatic control of 10 W solar panel in East-west and North-south & back	01 No.
96.	Solar PV e-learning software using animations for training		01 License



Solar Technician (Electrical)

97.	Halogen lamp with stand for illumination of solar panels in lab	AC mains operated to provide 0 to 1000 watts per meter square	02 Set
98.	Motorized Bench Grinder	AC mains operated	01 No.
99.	Battery Charger	0 - 6 - 9 - 12 - 24 - 48 V, 30amp	01 No.
100.	Solar photovoltaic module	75 W mono crystalline module 75 W amorphous silicon module 250 W thin film module 5W, 10W, 40W poly crystalline module	01 Each
101.	Solar panels	250 Wp	04 Nos.
102.	Solar Charge controller with Dusk to Dawn automatic switching	12V, 10A	05 Nos.
103.	Solar charge controller with manual switch (Day lighting)	12 V 10 A	05 Nos.
104.	Array junction box	for connecting 250W x 4 Nos. solar panel with DC fuse, DC MCB, and surge suppressor protection	02 Nos.
105.	Solar lantern	LED type	01 No.
106.	Solar lantern	CFL type	01 No.
107.	Solar lantern assembly sets		01 No.
108.	Home light system	12 V DC with FM receiver, LED bulb and mobile charger as loads	01 No.
109.	Solar cell kit		01 No.
110.	Clinometer	for Angle measurement	01 No.
111.	Spirit level	For floor level check	01 No.
112.	Anemometer	for wind speed measurement	01 No.
113.	DC table fan	12 V	01 No.
114.	A.C. Voltmeter M.I	0 –500V AC	02 Nos.
115.	Volt meter	0 - 30V	02 Nos.
116.	Volt meter	0 - 100V	02 Nos.
117.	Ammeter MC	0 - 1A	02 Nos.
118.	Ammeter MC	0 - 5A	02 Nos.
119.	Ammeter MCcentre zero	0 - 20A	02 Nos.
120.	Ammeter MCcentre zero	0-50A	02 Nos.
121.	Power Factor Meter		01 No.



Solar Technician (Electrical)

122.	Rheostat	0 -1 Ohm, 5 Amp 0 -10 Ohm, 5 Amp 0- 25 Ohm, 1 Amp 0- 300 Ohm, 1 Amp	01 No. each
123.	A.C. Energy Meter	Single Phase, 10 A, 240 V induction type	01 No.
124.	A.C. Energy Meter	Three Phase, 15 A, 440 V induction type	01 No.
125.	Kilo Wattmeter Analog	0-1.5-3KW, pressure coil rating-240v/440v, current rating-5A/10A Analog, portable type Housed in bakelite case	02 Nos.
126.	Digital Wattmeter	230 V, 1 KW, 50 Hz	02 Nos.
127.	Phase Sequence Indicator	3 Phase, 415 V	02 Nos.
128.	Frequency Meter	45 to 55 Hz	02 Nos.
129.	DC LED Lamp	3W, 5W, 10W	50 Each
130.	DC Pump	24 V	02 Nos.
131.	PWM Controller		04 Nos.
132.	MPPT Charge Controller		04 Nos.
133.	Inverter with Battery	1 KVA with 12 V Battery Input- 12 volt DC, Output- 220 volt AC	01 No.
134.	Solar PCU	Off grid 1 KW MPPT Sine wave Solar Power Conditioning Unit	04 Nos.
135.	Solar Grid tied inverter Demonstrator kit	300W KW	01 No.
136.	Solar Street Light	12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 60 W LED lights and 9 m height pole all dismantable	01 Nos.
137.	Solar, wind and hybrid power plant	1 KW cumulative	01 No.
138.	Solar Traffic Light	12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 15 W LED lights with suitable colors and 9 m height pole all dismantable	01 No.
139.	Used water treatment solar plant demonstrator kit	1 liter capacity	01 No.
140.	solar DC pump	1 HP	01 No.
141.	Demonstration kit for wind	300 W	01 No.

**Solar Technician (Electrical)**

	generation (Wind turbine with blower)		
142.	Rechargeable battery	12 V 100 Ah	As required
143.	Rechargeable battery	12 V 7 Ah	As required
144.	Rechargeable battery	6 V 5 Ah	As required
145.	LED lights	12 V DC	As required
146.	LED lights	6 V DC	As required
C. SAFETY AND PROTECTIVE EQUIPMENT			
147.	Rubber gloves		10 Pair
148.	Cotton gloves		05 Pair
149.	Gum boots		02 Pair
150.	Safety Goggles		04 Nos.
151.	Safety Helmet		04 Nos.
152.	First Aid kit		02 Nos.
153.	Fire Extinguisher CO ₂	Arrange all proper NOCs and equipments from Municipal/Competent authorities.	
D. SHOP FLOOR FURNITURE AND MATERIALS			
154.	Working Bench	2.5 m x 1.20 m x 0.75 m	04 Nos.
155.	Wiring Board	3 meters x 1 meter with 0.5 meter projection on the top	01 No.
156.	Instructor's table		01 No.
157.	Instructor's chair		02 Nos.
158.	Trainee Chair		01 for Each Trainee
159.	Trainee table for two trainee		10 Nos.
160.	Metal Rack	100cm x 150cm x 45cm	04 Nos.
161.	Lockers with drawers		01 for Each Trainee
162.	Almirah	2.5 m x 1.20 m x 0.5 m	01 No.
163.	Black board/white board	(Minimum 4X6 feet)	01 No.
Note: -			
<ol style="list-style-type: none"> 1. All the tools and equipment are to be procured as per BIS specification. 2. Internet facility is desired to be provided in the class room. 			



ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities

