MODULE II

ELECTRICAL INSTALLATION TECHNOLOGY

ENG/OS/EI/CR/01/4/MB

INSTALL STAND-ALONE SOLAR PV SYSTEMS

SEPTEMBER-NOVEMBER 2025

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

PRACTICAL ASSESSMENT

INSTRUCTIONS TO THE ASSESSOR:

1. This assessment is to take place in the prescribed order as arranged in the tool.
2. Capture clear **photographs** and/or **videos** of each candidate's work as they perform the tasks and Label all media files with: Candidate Registration Number, Unit Code, Practical Session Number, and Date.
3. Record candidate scores and assessor remarks in the observation checklists for each session.
4. Store all completed checklists, media files, and candidate drawings in a secure digital/physical folder per candidate.
5. All measurements are in millimeters (mm)

CANDIDATE & ASSESSOR DETAILS

Candidate Name:	**CDACC Reg. No.:**
Assessor Name:	**Assessor ID Number:**

PRACTICAL BRIEF

In this practical, you will be required to demonstrate competence in installing Stand-alone Solar PV Systems based on the provided drawing. The assessment will involve hands-on sessions and an oral assessment.

SESSION 1 (3 HOURS): INSTALL STAND-ALONE PV COMPONENTS

Assessment Date:	
Assessment Venue:	

PRACTICAL CHECKLIST

No.	Items of Evaluation	Max Marks	Awarded
1.	Wore PPEs as per OSHA and EHS standards • Helmet (*Award 1 mark or zero*) • Safety boot (*Award 1 mark or zero*) • Apron/overall (*Award 1 mark or zero*)	 1 1 1	
2.	Drew the wiring diagram of the solar PV components • PV module (*Award 2 marks or zero*) • Charge controller (*Award 2 marks or zero*) • Battery (*Award 2 marks or zero*) • Inverter (*Award 2 marks or zero*)	 2 2 2 2	
3.	Performed correct terminations at: • PV module (*Award 2 marks or zero*)	 2	

	• Charge controller (*Award 2 marks or zero*) • Battery (*Award 2 marks or zero*) • Inverter (*Award 2 marks or zero*)	2 2 2	
4.	Mounted Components firm and level: • PV module (*Award 2 marks or zero*) • Charge controller (*Award 2 marks or zero*) • Battery (*Award 2 marks or zero*) • Inverter (*Award 2 marks or zero*)	 2 2 2 2	
5.	Observed colour coding (*Award 2 marks for each connection or zero*)	6	
	Total Session 1	**33**	
REMARKS:			

NB: Photos and videos should be taken as the candidate performs items 4

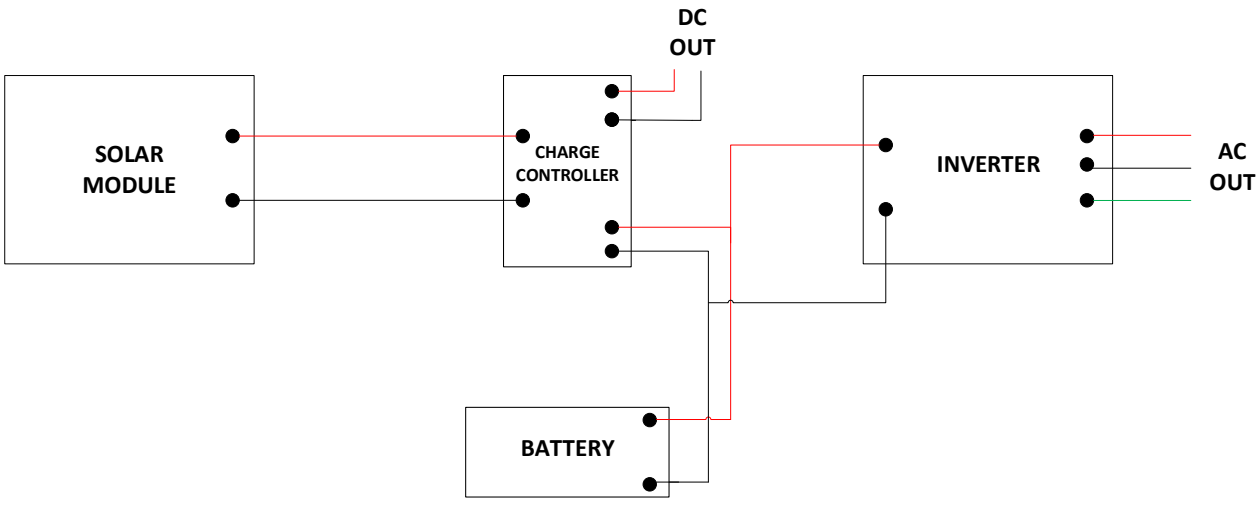

Figure 1: Wiring Diagram

SESSION 2 (4 HOURS): INSTALLATION OF ELECTRICAL WIRING SYSTEM

Assessment Date:	
Assessment Venue:	

PRACTICAL CHECKLIST

No.	Items of Evaluation	Max Marks	Awarded
1.	Wore PPEs as per OSHA and EHS standards • Helmet (*Award 1 mark or zero*) • Safety boot (*Award 1 mark or zero*) • Apron/overall (*Award 1 mark or zero*)	 1 1 1	
2.	Drew the wiring diagram • Solar equipment intake point (*Award 3 marks or zero*) • Socket (*Award 2 marks or zero*) • DC Lighting (*Award 2 marks or zero*) • AC Lighting (*Award 3 marks or zero*)	 3 2 2 3	
3.	Correctly used tools and equipment as Per work requirement. • Cutting tools; *(Hacksaw)* (*Award 1 mark or zero*) • Cable stripping *(side cutter, combinational pliers)* (*Award 1 mark or zero*) • Fastening *(Screw Driver)* (*Award 1 mark or zero*) • Measuring tools *(Tape measure)* (*Award 1 mark or zero*) • Marking tools *(Marker)* (*Award 1 mark or zero*)	 1 1 1 1 1	

4.	Mounted the circuit components • Firmness (*Award 1 marks or zero for any five*) • Level (*Award 1 marks or zero for any five*)	 5 5	
5.	Installed trunking system • Firmness (*Award 1 marks or zero for any five*) • Level (*Award 1 marks or zero for any five*) • Dimensions ±2mm (*Award 1 marks or zero for any five*) • Neatness (*Award 2 marks or zero*)	 5 5 5 2	
6.	Installed and terminated cables to respective fittings • Cable jointing (straight twist) (*Award 2 marks or zero*) • Proper terminations (*Award 5 marks or zero*) • Cable management (*Award 3 marks or zero*) • Colour coding (*Award 2 marks or zero*)	 2 5 3 2	
7.	Performed housekeeping procedures • Cleaned working area after work (*Award 2 marks or zero*) • Cleaned tools and stored/arranged them (*Award 2 marks or zero*)	 2 2	
	Total Session 2	**61**	
REMARKS:			

NB: Photos and videos should be taken as the candidate performs items 4, 5 and 6.

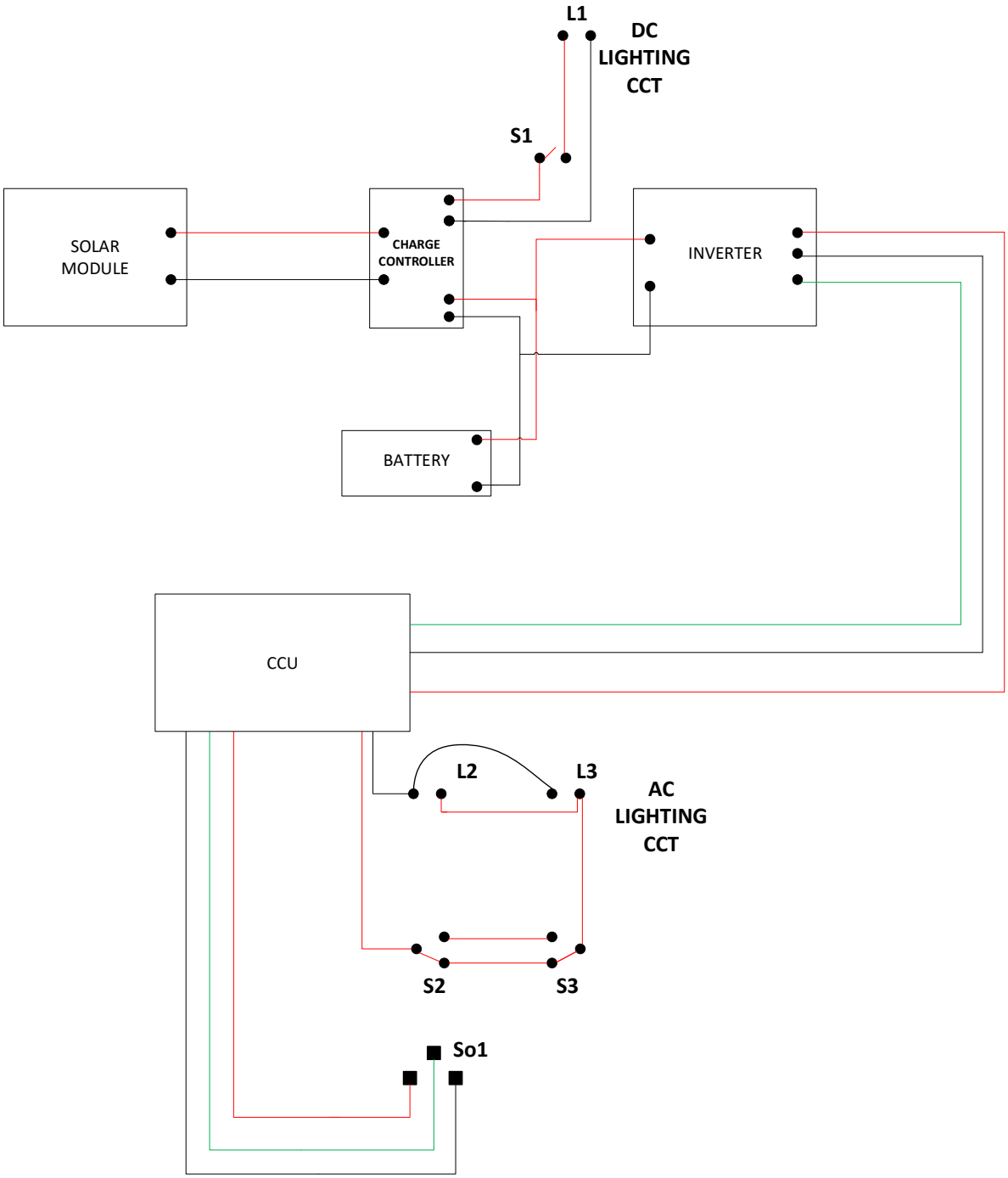

Figure 2: Wiring Diagram

SESSION 3 (4 HOURS): TESTING STAND ALONE SOLAR PV SYSTEM INSTALLATION

Assessment Date:	
Assessment Venue:	

PRACTICAL CHECKLIST

No.	Items of Evaluation	Max Marks	Awarded
1.	Wore PPEs as per OSHA and EHS standards • Helmet (*Award 1 mark or zero*) • Safety boot (*Award 1 mark or zero*) • Apron/overall (*Award 1 mark or zero*)	 1 1 1	
2.	Inspected solar PV system conditions as per the IET standards • Visual inspection for physical damages, loose connections and bulging of battery. (*Award 1 mark or zero*) • Status of battery terminals (i.e. corrosion). (*Award 1 mark or zero*) • Overheating (*Award 1 mark or zero*)	 1 1 1	
3.	Correctly used maintenance tools and materials: • Multimeter (*Award 1 mark or zero*) • Earth resistance tester (*Award 1 mark or zero*) • Insulation resistance tester (*Award 1 mark or zero*) • Panel cleaning material (*Award 1 mark or zero*) • Battery terminal cleaning (*Award 1 mark or zero*)	 1 1 1 1 1	

4.	Performed the tests: • Continuity test (*Award 2 marks or zero*) • Polarity test (*Award 2 marks or zero*) • Earth resistance test (*Award 2 marks or zero*) • Insulation resistance test (*Award 2 marks or zero*)	 2 2 2 2	
5.	Circuit operated correctly: • Solar equipment intake point (*Award 3 marks or zero*) • Socket (*Award 2 marks or zero*) • DC Lighting (*Award 2 marks or zero*) • AC Lighting (*Award 4 marks or zero*)	 3 2 2 4	
	Total Session 3	**30**	
REMARKS:			

NB: Photos and videos should be taken as the candidate performs items 5.

SESSION 4 (1 HOUR): ORAL ASSESSMENT (25 MARKS)

Assessor to award marks for each correct response by the candidate in the table below:

Q#	Question	Expected Key response	Max Marks	Awarded
1.	Name the basic SI units for: • Voltage • Current • Resistance • Power	Volt (V), Ampere (A), Ohm (Ω), Watt (W). *(Award 1 mark for any correct)*	4	
2.	What physical quantity is measured in coulombs (C)?	electric charge *(1 mark or zero for unit)*	1	
3.	State three safety measures to apply before starting installation of solar PV components.	Use PPE (gloves, goggles), isolate power source, verify no live circuits, ensure proper grounding. *(Award 1 mark or zero for any measure)*	3	
4.	State the function the following components of a stand-alone solar PV system: • Solar panel • Solar panel • Charge controller • Inverter	Solar panel (converts sunlight to electricity), Solar panel (stores energy), charge controller (regulates charging), inverter (converts DC to AC). *(Award 1 mark or zero)*	4	
5.	Describe the procedure of preparing electrical cable joint.	Strip insulation correctly, use proper connectors, crimp securely, ensure tight connections to avoid resistance	4	

		and overheating. *(Award 1 mark or zero for each point)*		
6.	Explain two importance of cable management systems in solar PV installations	Organize and protect cables, prevent damage, ensure safety and neatness. *(Award 2 marks for correct description)*	2	
7.	What is the purpose of performing a continuity test in the solar PV system?	Verify that electrical circuits are complete with no breaks. *(Award 1 mark or zero)*	1	
8.	Name the equipment used in Insulation Resistance test.	Megger *(Award 1 mark or zero)*	1	
9.	List three maintenance activities regularly performed on stand-alone solar PV systems.	Cleaning panels, checking connections, inspecting batteries, tightening bolts, checking charge controller status. *(Award 1 mark or zero per any correct activity)*	3	
10.	Mention two importance of keeping maintenance records for solar PV systems updated?	Track system performance, schedule maintenance, assist troubleshooting, support warranties. *(Award 1 mark or zero for any correct response)*	2	
	Total Oral		**25**	

SUMMARY OF ASSESSMENT

SECTION	**Total Marks**	**Marks Awarded**
Assessment 1	33	
Assessment 2	61	
Assessment 3	30	
TOTAL	**124**	
Percentage %		
ORAL ASSESSMENT		
Oral Assessment	**25**	
Percentage %		

The candidate was found to be:

Competent ☐ Not yet Competent ☐

(Please tick as appropriate)

The candidate is competent if the candidate obtains at least 50%