

## **Solar Installation Technician Assistant (SITA)**

### **Core Qualification File Syllabus**

Learning Outcomes	Theory	Practical
1. Able to understand the concept of conventional & non-conventional sources of energy.  10 (Th-10, P-0)	1.1 Recognize different sources of conventional & Non-conventional energy.	
	1.2 Differentiate between conventional & non-conventional energy with their limitations.	
	1.3 Advantages & disadvantages of Non-conventional energy.	
	1.4. Identify the reasons for Non-conventional energy getting so popular in future.	
	1.5 Identify the potentials for development of Non-conventional energy in India.	
	1.6 Know about various applications of solar energy.	
	1.7 Identify the various scopes of employment and entrepreneurship in solar energy sector.	
2. Able to learn solar geometry and magnitude of solar radiation with movement of sun.  16(Th-6+Pr-10)	2.1 Understand the concept of solar geometry with different angles.	
	2.2 State nature of sun movement in a day, in a year.	
	2.3 Explain the reason of summer solstice and winter solstice.	
	2.4 Define direct, diffuse and global solar radiation.	
		2.5 Measure daily solar radiation (direct and diffuse) on horizontal surface with the help of Pyranometer. Calculate solar radiation on any plane using the measured data.
3. Able to learn the working principle solar cooker and its applications. Know the troubleshooting of the item.  16(Th-6+Pr-10)	3.1 Explain the basic working principle of solar cooker.	
	3.2 Categorize the designs of solar cooker available in the market.	
		3.3 Collect information on solar cooker manufacturers in India.
		3.4 How to introduce solar cookers for house hold & community applications.
		3.5 Identify the components required for maintenance of solar cooker.
	3.6 Know about the limitations of solar cooker.	
4. Able to understand	4.1 Explain the working principle of solar hot water system – using copper flat plate	

working principle of solar hot water system.	collectors.	
Recognize construction of different Solar collectors with their installation and commissioning.	4.2 Explain the working principle of solar hot water system - using evacuated tube collectors (ETC).	
	4.3 Explain thermo Siphon process.	
	4.4 Classify the types of solar collectors available in the market.	
24(Th-10+Pr-14)	4.5 Explain the working principle of concentrating solar collectors - Focusing type collector.	
	4.6 Explain the working principle of cylindrical parabolic type solar collector.	
		4.7 Identify the components required for maintenance of flat plate collectors.
		4.8 Follow the steps for installation of solar hot water system and execute it – using copper flat plate collectors. Measure its parameters after commissioning.
5. Able to understand working principle of solar air heater system and its components and install solar air heater.	5.1 Understand working principle of solar air heater system and its components.	
20(Th-6+Pr-14)		5.2 Make arrangements to install solar air heater in multistoried buildings.
6. Able to apply the principle of Solar heat Storage in energy storage systems.	6.1 Understand the kinds heat storage-Sensible heat & Latent heat	
16(Th-6+Pr-10)		6.2 Understand the working principle Solar pond and its application.
7. Able to understand the working of Solar Photo-voltaic cell and apply PV module for solar power generation.	7.1 Explain the operation of a solar PV cell.	
	7.2 Differentiate between solar PV module, PV panel and PV array.	
		7.3 Assemble solar PV array from PV module.
24(Th-10+Pr-14)		7.4 Execute the operations for installation of Solar PV module along street.
		7.5 List the types of fault occur in a SPV array and their remedy.
		7.6 Install solar PV array with other accessories for solar power generation.
8. Able to recognize the construction and operation of Storage battery.	8.1 Identify different components of storage battery.	
	8.2 Explain the working of a storage battery.	

Battery. 16(Th-6+Pr-10)	8.3 Explain the construction & working of Hydrometer.	
		8.4 Make connection of battery in series & parallel.
		8.5 Identify the probable faults in a battery and their remedies.
9. Able to know the installation procedure of solar street lighting. Know the components required for it.  26(Th-12+Pr-14)	9.1 Identify main parts of solar photovoltaic lighting system.	
	9.2 Identify components of charge controller and understand its operation.	
	9.3 Identify components of inverter and understand its operation.	
	9.4 Identify the nature of faults in solar lighting system and find out their remedies.	
		9.5 Execute the operations for installation of solar street lighting system.
		9.6 Draw wiring plan & location of loads & charge controllers & solar PV modules to avoid loss.
		9.7 Perform the necessary tests before and after commissioning the solar lighting system.

## **OUTCOMES**

Outcomes to be assessed	Assessment criteria for the outcome
1. Differentiate between conventional & non-conventional sources of energy	1.1 Recognize different sources of conventional & Non-conventional energy.
	1.2 Differentiate between conventional & non-conventional energy with their limitations.
	1.3 Advantages & disadvantages of Non-conventional energy.
	1.4 Identify the reasons for Non-conventional energy getting so popular in future.
	1.5 Identify the potentials for development of Non-conventional energy in India.
	1.6 Know about various applications of solar energy.
	1.7 Identify the various scopes of employment and entrepreneurship in solar energy sector.
2. Measure daily solar radiation with Pyranometer to understand its variation due to several factors.	2.1 Understand the concept of solar geometry with different angles.
	2.2 State nature of sun movement in a day, in a year.
	2.3 Explain the reason of summer solstice and winter solstice.
	2.4 Define direct, diffuse and global solar radiation.
	2.5 Measure daily solar radiation (direct and diffuse) on horizontal surface with the help of Pyranometer. Calculate solar radiation on any plane using the measured data.
3. Install and use Solar Cooker	3.1 Explain the basic working principle of solar cooker.

	3.2 Categorize the designs of solar cooker available in the market.
	3.3 Collect information on solar cooker manufacturers in India.
	3.4 How to introduce solar cookers for house hold & community applications.
	3.5 Identify the components required for maintenance of solar cookers.
	3.6 Know about the limitations of solar cooker.
4. Install Solar Hot Water System with all its components	4.1 Explain the working principle of solar hot water system – using copper flat plate collectors.
	4.2 Explain the working principle of solar hot water system - using evacuated tube collectors (ETC).
	4.3 Explain thermo Siphon process.
	4.4 Classify the types of solar collectors available in the market.
	4.5 Explain the working principle of concentrating solar collectors - Focusing type collector.
	4.6 Explain the working principle of cylindrical parabolic type solar collector.
	4.7 Identify the components required for maintenance of flat plate collectors.
	4.8 Follow the steps for installation of solar hot water system and execute it – using copper flat plate collectors. Measure its parameters after commissioning.
5. Install solar PV module for solar power generation.	6.1 Explain the operation of a solar PV cell.
	6.2 Differentiate between solar PV module, PV panel and PV array.
	6.3 Assemble solar PV array from PV module.
	6.4 Execute the operations for installation of Solar PV module along street.
	6.5 List the types of fault occur in a SPV array and their remedy.
	6.6 Install solar PV array with other accessories for solar power generation.
6. Provide servicing to Storage Battery.	7.1 Identify different components of storage battery.
	7.2 Explain the working of a storage battery.
	7.3 Explain the construction & working of Hydrometer.
	7.4 Make connection of battery in series & parallel.
	7.5 Identify the probable faults in a battery and their remedies.
7. Install solar street lighting system.	8.1 Identify main parts of solar photovoltaic lighting system.
	8.2 Identify components of charge controller and understand its operation.
	8.3 Identify components of inverter and understand its operation.
	8.4 Identify the nature of faults in solar lighting system and find out their remedies.
	8.5 Execute the operations for installation of solar street lighting

	system.
	8.6 Draw wiring plan & location of loads & charge controllers & solar PV modules to avoid loss.
	8.7 Perform the necessary tests before and after commissioning the solar lighting system.