

## Qualification Pack



# Solar PV Installer - Electrical

QP Code: SGJ/Q0102

Version: 4.0

NSQF Level: 4

Skill Council for Green Jobs || 3rd Floor, CBIP Building, Malcha Marg, Chanakyapuri  
New Delhi - 110021 || email:sarvesh@sscgj.in

## Qualification Pack

### Contents

SGJ/Q0102: Solar PV Installer - Electrical .....	3
<i>Brief Job Description</i> .....	3
Applicable National Occupational Standards (NOS) .....	3
<i>Compulsory NOS</i> .....	3
<i>Qualification Pack (QP) Parameters</i> .....	3
SGJ/N0101: Site survey for installation of solar PV system .....	5
SGJ/N0102: Procure Solar PV system components .....	13
SGJ/N0104: Installation of electrical components of a solar PV system .....	19
SGJ/N0105: Test and commission Solar PV system .....	25
SGJ/N0106: Maintain Personal Health & Safety at project site .....	31
DGT/VSQ/N0102: Employability Skills (60 Hours) .....	36
Assessment Guidelines and Weightage .....	43
<i>Assessment Guidelines</i> .....	43
<i>Assessment Weightage</i> .....	44
Acronyms .....	45
Glossary .....	46

## Qualification Pack

### SGJ/Q0102: Solar PV Installer - Electrical

#### Brief Job Description

Solar PV Installer - Electrical installs, tests and commissions different electrical components of photovoltaic systems, that meet the performance and reliability needs of customers. The work is performed by incorporating quality craftsmanship while complying with all applicable codes, standards and safety requirements.

#### Personal Attributes

The candidate must be diligent, hardworking, organised and a team player to be successfully able to complete the job safely and timely. She/He must also demonstrate strong work ethics, communicate courteously with co-workers and must be good with following instructions of the supervisor.

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [SGJ/N0101: Site survey for installation of solar PV system](#)
2. [SGJ/N0102: Procure Solar PV system components](#)
3. [SGJ/N0104: Installation of electrical components of a solar PV system](#)
4. [SGJ/N0105: Test and commission Solar PV system](#)
5. [SGJ/N0106: Maintain Personal Health & Safety at project site](#)
6. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	Solar Panel Installation Technician
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Credits</b>	13

### Qualification Pack

<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO- 2015/7421.1401
<b>Minimum Educational Qualification &amp; Experience</b>	<p>12th grade Pass (with Science or Equivalent) with NA of experience OR 10th grade pass with 3 Years of experience Renewable energy/power sector experience OR 10th grade pass ( with 2 years of any combination of NTC/NAC/CITS in relevant trade ) with NA of experience OR Previous relevant Qualification of NSQF Level ( 3.5 (Solar PV Site Survey Assistant)) OR Previous relevant Qualification of NSQF Level ( 3.0 (Assistant Technician – Solar Panel Installation)) with 3 Years of experience of Renewable energy/power sector experience</p>
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	NA
<b>Next Review Date</b>	29/05/2027
<b>NSQ Approval Date</b>	30/05/2024
<b>Version</b>	4.0
<b>Reference code on NQR</b>	QG-04-ES-02629-2024-V2-SCGJ
<b>NQR Version</b>	2

#### Remarks:

Total 390 Notional hours i.e. 13 Credits (including Theory : 165 + Practical: 105+OJT : 120)

## Qualification Pack

### SGJ/N0101: Site survey for installation of solar PV system

#### Description

This unit is about the survey of site for installation of solar photovoltaic plant.

#### Scope

The scope covers the following :

- Roles and responsibilities of a Solar PV Installer
- Discuss solar energy concepts
- Assess the site conditions
- Identify load to be connected to solar PV system
- Material conservation and use of environment friendly materials

#### Elements and Performance Criteria

##### *Introduction to Solar PV Installer Course*

To be competent, the user/individual on the job must be able to:

- PC1.** explain the role of a Solar PV Installer and emerging jobs & entrepreneurial opportunities.
- PC2.** illustrate the advantages of doing this course.
- PC3.** explain the importance of basic skills for communication; along with how to work effectively with others while respecting gender and disability concerns.
- PC4.** explain the importance of reading and interpreting signs, notices and/or cautions at project site.
- PC5.** demonstrate general discipline during the training program.
- PC6.** demonstrate how to interpret signs, notices and/or cautions at project site.

##### *Basics of Solar Energy and Electrical Concepts*

To be competent, the user/individual on the job must be able to:

- PC7.** explain Ohm's Law.
- PC8.** explain the basics of solar energy/ electricity and electrical concepts.
- PC9.** explain the relevance of Diffused Normal Irradiance (DNI) and Global Horizontal Irradiance (GHI) along with differences in Irradiance & Irradiation.
- PC10.** illustrate the movement of the sun and assess its effect on the performance of the solar power plant.
- PC11.** perform simple calculations to illustrate the fundamental concepts of power and energy.
- PC12.** demonstrate how the movement of sun affects the performance of the solar power plant.

##### *Site Survey for Installation of Solar PV System and assess the customer's Solar PV Requirement*

To be competent, the user/individual on the job must be able to:

- PC13.** describe how to observe Sun path diagram and explain the importance of shading analysis.
- PC14.** explain the importance of assessing various site conditions for safe installation of solar PV system.
- PC15.** assess the location, any site level pre- requisites and optimise the route plan.

## Qualification Pack

- PC16.** identify and list the load to be connected to the Solar PV system.
- PC17.** describe load profile.
- PC18.** explain the importance of engaging with customers for any specific requirement and budget constraints while identifying opportunities for deploying innovative energy solution like “Plug and Play” or “Behind the Meter” solution, where typical civil construction work may not be required.
- PC19.** describe the importance of system sizing and explain its calculation with basic mathematical tools.
- PC20.** explain how to prepare a site map.
- PC21.** explain the use of Software tools/App for performing Site survey.
- PC22.** explain how to use Google Earth for generating KMZ file and estimating the Area for the solar installation.
- PC23.** explain how to read the Electricity bill.
- PC24.** demonstrate how to observe Sun path diagram and perform shading analysis.
- PC25.** demonstrate how to assess the site conditions for safe installation of Solar PV system and optimise route plan.
- PC26.** demonstrate how to assess the load to be connected to the Solar PV system and how to prepare the load profile.
- PC27.** demonstrate how to engage with customers to meet their energy requirements, including through deploying innovative energy solutions like “behind the meter” system.
- PC28.** perform system sizing calculations.
- PC29.** show how to prepare a site map of the location where installation has to be carried out.
- PC30.** show how to decide on type of mounting to be created and explain customers about any civil work to be undertaken.
- PC31.** show how to identify processes where material/resource utilization including water can be optimized.
- PC32.** demonstrate how to generate KMZ file.
- PC33.** demonstrate how to use PV Syst/Sketchup for Site survey and shadow analysis.

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** company's installation policy
- KU2.** company's customer support policy
- KU3.** authority of Specified Field Safety Officer and Supervisor
- KU4.** company's reporting structure
- KU5.** general terminologies associated with solar power plant
- KU6.** basic concepts of trigonometry and coordinate geometry
- KU7.** units and symbols for irradiation and irradiance
- KU8.** effect on array output of current and voltage based on series / parallel connections of modules, tilt angle, orientation and shading



## Qualification Pack

- KU9.** simple calculations to derive the power and energy received from solar radiation in a given area
- KU10.** efficiency, cost and typical specifications, functioning and operating principle of different types of solar photovoltaic plants, commercially available pv modules, inverters, charge controllers, battery, mounting structures, cables, junction boxes and other components
- KU11.** mechanical and electrical features necessary for the long life of the pv power plant under a wide range of operating conditions
- KU12.** latest technologies used in system configurations like plug and play or behind the meter systems
- KU13.** basics of how to use google earth as a tools for site survey, KMZ file preparation
- KU14.** reporting protocol and documentation required
- KU15.** parameters and data required for material and energy audit
- KU16.** latest methods of energy and material conservation
- KU17.** environment friendly materials available to replace conventional materials
- KU18.** methods of reducing electrical consumption

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** read vernacular/English language
- GS2.** read and understand manuals, health and safety instructions, memos, other company documents
- GS3.** read from different sources- books, screens in machines and signage
- GS4.** identify various colour codes as per standard electrical, mechanical and civil nomenclature
- GS5.** express statements or information clearly so that others can hear and understand
- GS6.** participate in and understand the main points of simple discussions
- GS7.** respond appropriately to any queries
- GS8.** communicate with Supervisor
- GS9.** follow organization rule-based decision making process
- GS10.** take decision with systematic course of actions and/or response
- GS11.** organize work to meet deadlines
- GS12.** work constructively and collaboratively with others
- GS13.** follow code of conduct
- GS14.** manage relationships with customers with intent on satisfying requirements of service delivery
- GS15.** recognize problems and search for solutions
- GS16.** choose best methods to complete assigned tasks
- GS17.** approach relevant authority when required
- GS18.** apply domain knowledge
- GS19.** evaluate information obtained from customers, supervisor and co-workers
- GS20.** communicate with team members and colleagues on the significance of greening of jobs

## Qualification Pack

- GS21.** make timely decisions for efficient utilization of resources
- GS22.** practice and accept gender equality and disability in team
- GS23.** communicate with industries and customers to understand market



## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Solar PV Installer Course</i>	<b>12</b>	<b>7</b>	-	-
<b>PC1.</b> explain the role of a Solar PV Installer and emerging jobs & entrepreneurial opportunities.	3	-	-	-
<b>PC2.</b> illustrate the advantages of doing this course.	3	-	-	-
<b>PC3.</b> explain the importance of basic skills for communication; along with how to work effectively with others while respecting gender and disability concerns.	3	-	-	-
<b>PC4.</b> explain the importance of reading and interpreting signs, notices and/or cautions at project site.	3	-	-	-
<b>PC5.</b> demonstrate general discipline during the training program.	-	3	-	-
<b>PC6.</b> demonstrate how to interpret signs, notices and/or cautions at project site.	-	4	-	-
<i>Basics of Solar Energy and Electrical Concepts</i>	<b>12</b>	<b>6</b>	-	-
<b>PC7.</b> explain Ohm's Law.	3	-	-	-
<b>PC8.</b> explain the basics of solar energy/ electricity and electrical concepts.	3	-	-	-
<b>PC9.</b> explain the relevance of Diffused Normal Irradiance (DNI) and Global Horizontal Irradiance (GHI) along with differences in Irradiance & Irradiation.	3	-	-	-
<b>PC10.</b> illustrate the movement of the sun and assess its effect on the performance of the solar power plant.	3	-	-	-
<b>PC11.</b> perform simple calculations to illustrate the fundamental concepts of power and energy.	-	3	-	-
<b>PC12.</b> demonstrate how the movement of sun affects the performance of the solar power plant.	-	3	-	-
<i>Site Survey for Installation of Solar PV System and asses the customer's Solar PV Requirement</i>	<b>33</b>	<b>30</b>	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC13.</b> describe how to observe Sun path diagram and explain the importance of shading analysis.	3	-	-	-
<b>PC14.</b> explain the importance of assessing various site conditions for safe installation of solar PV system.	3	-	-	-
<b>PC15.</b> assess the location, any site level pre-requisites and optimise the route plan.	3	-	-	-
<b>PC16.</b> identify and list the load to be connected to the Solar PV system.	3	-	-	-
<b>PC17.</b> describe load profile.	3	-	-	-
<b>PC18.</b> explain the importance of engaging with customers for any specific requirement and budget constraints while identifying opportunities for deploying innovative energy solution like “Plug and Play” or “Behind the Meter” solution, where typical civil construction work may not be required.	3	-	-	-
<b>PC19.</b> describe the importance of system sizing and explain its calculation with basic mathematical tools.	3	-	-	-
<b>PC20.</b> explain how to prepare a site map.	3	-	-	-
<b>PC21.</b> explain the use of Software tools/App for performing Site survey.	3	-	-	-
<b>PC22.</b> explain how to use Google Earth for generating KMZ file and estimating the Area for the solar installation.	3	-	-	-
<b>PC23.</b> explain how to read the Electricity bill.	3	-	-	-
<b>PC24.</b> demonstrate how to observe Sun path diagram and perform shading analysis.	-	3	-	-
<b>PC25.</b> demonstrate how to assess the site conditions for safe installation of Solar PV system and optimise route plan.	-	3	-	-
<b>PC26.</b> demonstrate how to assess the load to be connected to the Solar PV system and how to prepare the load profile.	-	3	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC27.</b> demonstrate how to engage with customers to meet their energy requirements, including through deploying innovative energy solutions like “behind the meter” system.	-	3	-	-
<b>PC28.</b> perform system sizing calculations.	-	3	-	-
<b>PC29.</b> show how to prepare a site map of the location where installation has to be carried out.	-	3	-	-
<b>PC30.</b> show how to decide on type of mounting to be created and explain customers about any civil work to be undertaken.	-	3	-	-
<b>PC31.</b> show how to identify processes where material/resource utilization including water can be optimized.	-	3	-	-
<b>PC32.</b> demonstrate how to generate KMZ file.	-	3	-	-
<b>PC33.</b> demonstrate how to use PV Syst/Sketchup for Site survey and shadow analysis.	-	3	-	-
<b>NOS Total</b>	<b>57</b>	<b>43</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N0101
<b>NOS Name</b>	Site survey for installation of solar PV system
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	Site survey, Solar Panel Installation Technician
<b>NSQF Level</b>	4
<b>Credits</b>	2
<b>Version</b>	5.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	29/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### SGJ/N0102: Procure Solar PV system components

#### Description

This unit is about procurement of PV system component while confirming and adapting to system design

#### Scope

The scope covers the following :

- Discuss system components and manufacturer specification sheet
- Prepare Bill of Material
- Procure the components
- Verify the components on-site
- Material conservation and use of environment friendly materials

#### Elements and Performance Criteria

##### *Basics of Solar Photovoltaic system and its Components*

To be competent, the user/individual on the job must be able to:

- PC1.** explain various terminologies used in the solar industry.
- PC2.** identify the different components of a Solar PV system and explain its basic operation.
- PC3.** explain various Solar PV cell technologies - Mono & Poly Crystalline.
- PC4.** explain the working of different types of Solar PV systems.
- PC5.** discuss the latest and innovative technologies used in system configurations like “Plug & Play” or “Behind the Meter” energy systems.
- PC6.** describe the different types, sizes and specifications of modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries and allied accessories and analyse the different types, sizes and specifications of solar modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries and allied accessories
- PC7.** explain about the manufacturing data specification sheets of different types of solar PV components and analyse the manufacturing data specification sheets of different types of solar PV components.

##### *Interpretation of Drawings, Material Handling and storage of components on-site*

To be competent, the user/individual on the job must be able to:

- PC8.** explain the importance of reading and rightly interpreting Single Line Diagram (SLD), Layout Diagrams, Civil/Mechanical and Electrical Drawings and demonstrate how to read and rightly interpret Single Line Diagram (SLD), Layout Diagrams, Civil/Mechanical and Electrical Drawings.
- PC9.** describe the DO's and Don'ts of material handling and demonstrate the process of safe material handling.
- PC10.** explain how to read and interpret the Bill of Material to verify with the delivery of components on-site and show how to check materials received as per final BoM to ensure that the correct material for the job arrives on site and is damage free.
- PC11.** explain how to ensure that all the components are handled and stored properly as per standard operating procedures.

## Qualification Pack

- PC12.** describe the importance of Preparing Bill of Materials (BoM) including for portable and innovative solutions like Plug & Play or Behind the Meter system and demonstrate how to prepare Bill of Materials for solar PV system, including for innovative solutions like Plug & Play or Behind the Meter system.
- PC13.** explain how to approach organization's warehouse/vendors, suppliers and/or manufacturers to place the order for components as per BoM.
- PC14.** discuss how to ensure quantity of modules / panels, inverters etc matches with the requirement of the system and Show how to ensure that all materials are QC passed.
- PC15.** identify and list any variation in material specification and design and explain how to submit the documented variation to design team (if required) for approval or revised drawings and Show how to report and document the status of material received at site and take appropriate action for replacements, if any
- PC16.** introduce basics of Inventory management tools and its importance.
- PC17.** identify materials which can be replaced by environment friendly substitutes and identify processes where material utilization can be optimized and accordingly suggest those to higher authority.

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** company's installation policy
- KU2.** company's customer support policy
- KU3.** company's documentation policy
- KU4.** authority of specified Field Safety Officer and Supervisor
- KU5.** company's reporting structure
- KU6.** organizational culture
- KU7.** general terminologies associated with solar power plant
- KU8.** units and symbols for irradiation and irradiance
- KU9.** effect on array output of current and voltage based on series / parallel connections of modules, tilt angle, orientation and shading
- KU10.** simple calculations to derive the power and energy received from solar radiation in a given area
- KU11.** efficiency, cost and typical specifications functioning and operating principle of different types of commercially available photovoltaic modules, inverters, charge controllers, battery, mounting structures, cables, junction boxes and other components
- KU12.** mechanical and electrical features necessary for the long life of the PV system under a wide range of operating conditions
- KU13.** cabling route and length of cable requirement
- KU14.** labelling of PV system components
- KU15.** warranty documents of each component of the solar PV system
- KU16.** latest methods of energy and material conservation
- KU17.** environment friendly materials available to replace conventional materials
- KU18.** methods of reducing electrical consumptions

## Qualification Pack

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** read English and/or vernacular language
- GS2.** read and understand manuals, health and safety instructions, memos, other company documents
- GS3.** read from different sources- books screens in machines and signage
- GS4.** read various color codes, as per standard electrical, mechanical and civil nomenclature
- GS5.** express statements or information clearly so that others can hear and understand
- GS6.** participate in and understand the main points of simple discussions
- GS7.** respond appropriately to any queries
- GS8.** communicate with supervisor
- GS9.** follow organizational rule-based decision making process
- GS10.** take decision as per systematic course of actions
- GS11.** organize work to meet deadlines
- GS12.** work constructively and collaboratively with others
- GS13.** follow code of conduct
- GS14.** manage relationships with customers with intent on satisfying its requirements for service delivery
- GS15.** choose best methods to complete assigned tasks
- GS16.** apply domain knowledge, observations and data to select course of action to perform tasks related to solar photovoltaic systems
- GS17.** evaluate information obtained from customers, supervisor and co-workers to perform day to day activities
- GS18.** ask questions for better understanding
- GS19.** communicate with industries and customers to understand and analyze various strategies, demands and limitations in the market
- GS20.** demonstrate effective time and resource management techniques along with entrepreneurship skills
- GS21.** communicate with team members and colleagues on the significance of greening of jobs
- GS22.** make timely decisions for efficient utilization of resources



## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Basics of Solar Photovoltaic system and its Components</i>	<b>14</b>	<b>4</b>	-	-
<b>PC1.</b> explain various terminologies used in the solar industry.	2	-	-	-
<b>PC2.</b> identify the different components of a Solar PV system and explain its basic operation.	2	-	-	-
<b>PC3.</b> explain various Solar PV cell technologies - Mono & Poly Crystalline.	2	-	-	-
<b>PC4.</b> explain the working of different types of Solar PV systems.	2	-	-	-
<b>PC5.</b> discuss the latest and innovative technologies used in system configurations like “Plug & Play” or “Behind the Meter” energy systems.	2	-	-	-
<b>PC6.</b> describe the different types, sizes and specifications of modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries and allied accessories and analyse the different types, sizes and specifications of solar modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries and allied accessories	2	2	-	-
<b>PC7.</b> explain about the manufacturing data specification sheets of different types of solar PV components and analyse the manufacturing data specification sheets of different types of solar PV components.	2	2	-	-
<i>Interpretation of Drawings, Material Handling and storage of components on-site</i>	<b>18</b>	<b>14</b>	-	-
<b>PC8.</b> explain the importance of reading and rightly interpreting Single Line Diagram (SLD), Layout Diagrams, Civil/Mechanical and Electrical Drawings and demonstrate how to read and rightly interpret Single Line Diagram (SLD), Layout Diagrams, Civil/Mechanical and Electrical Drawings.	2	2	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC9.</b> describe the DO's and Don'ts of material handling and demonstrate the process of safe material handling.	2	2	-	-
<b>PC10.</b> explain how to read and interpret the Bill of Material to verify with the delivery of components on-site and show how to check materials received as per final BoM to ensure that the correct material for the job arrives on site and is damage free.	2	2	-	-
<b>PC11.</b> explain how to ensure that all the components are handled and stored properly as per standard operating procedures.	2	-	-	-
<b>PC12.</b> describe the importance of Preparing Bill of Materials (BoM) including for portable and innovative solutions like Plug & Play or Behind the Meter system and demonstrate how to prepare Bill of Materials for solar PV system, including for innovative solutions like Plug & Play or Behind the Meter system.	2	2	-	-
<b>PC13.</b> explain how to approach organization's warehouse/vendors, suppliers and/or manufacturers to place the order for components as per BoM.	2	-	-	-
<b>PC14.</b> discuss how to ensure quantity of modules / panels, inverters etc matches with the requirement of the system and Show how to ensure that all materials are QC passed.	2	2	-	-
<b>PC15.</b> identify and list any variation in material specification and design and explain how to submit the documented variation to design team (if required) for approval or revised drawings and Show how to report and document the status of material received at site and take appropriate action for replacements, if any	2	2	-	-
<b>PC16.</b> introduce basics of Inventory management tools and its importance.	2	-	-	-
<b>PC17.</b> identify materials which can be replaced by environment friendly substitutes and identify processes where material utilization can be optimized and accordingly suggest those to higher authority.	-	2	-	-
<b>NOS Total</b>	<b>32</b>	<b>18</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N0102
<b>NOS Name</b>	Procure Solar PV system components
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	Procurement, Procurement, Technician, Solar Panel Installation Technician
<b>NSQF Level</b>	4
<b>Credits</b>	2
<b>Version</b>	5.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	29/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### SGJ/N0104: Installation of electrical components of a solar PV system

#### Description

This unit is about installation of electrical components of the solar photovoltaic system.

#### Scope

The scope covers the following :

- Prepare for solar installation
- Install electrical components
- Install conduits and cables ensuring minimum wastage of materials
- Install battery bank (as required)
- Perform electrical grounding and install earthing and lightning arrestor
- Post work activities

#### Elements and Performance Criteria

##### *Installation of Electrical components of a Solar PV System*

To be competent, the user/individual on the job must be able to:

- PC1.** discuss how to implement site safety plan and inspect & utilise electrical installation toolkit and demonstrate how to install electrical components of solar PV system; including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.
- PC2.** identify tools and tackles for electrical component installation for Solar PV Power plant and demonstrate the application of tools & tackles used for cable and conduit installation.
- PC3.** describe the process of installing the electrical components including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.
- PC4.** explain the Do's and Don'ts of DC wiring and analyse how to perform DC wiring.
- PC5.** identify tools & tackles used for cable and conduit installation.
- PC6.** discuss and show how to ensure that the conduits and cables are properly supported, secured and labelled and demonstrate the application of tools & tackles used for cable and conduit installation.
- PC7.** describe the importance of Earthing for the protection of solar PV system and demonstrate how to perform earthing and grounding work for the protection of solar PV system.
- PC8.** explain the significance and types of earth faults as per standards.
- PC9.** explain the de-mounting of a solar PV power plant (after commissioning) and demonstrate demounting of solar PV power plant.
- PC10.** discuss function and installation of Remote monitoring unit, Temperature and radiation sensor.
- PC11.** show how to clean the work area after completing the installation work.

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

## Qualification Pack

- KU1.** government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and guidelines for working at height
- KU2.** information using appropriate corporate forms
- KU3.** authorization required from specified field safety officer and supervisor
- KU4.** legislative, organizational, site requirements and procedures
- KU5.** diagnostic/fault finding techniques
- KU6.** the environmental requirements
- KU7.** how to work in varying weather conditions
- KU8.** isolation procedures
- KU9.** tools and tackles required for installation
- KU10.** effect on array output of current and voltage based on series / parallel connections of modules, tilt angle, orientation and shading
- KU11.** efficiency, cost, typical specifications, functioning and operating principle of different types of commercially available pv modules, inverters, charge controllers, battery, cables, junction boxes and other electrical components
- KU12.** mechanical and electrical features necessary for the long life of the pv system under a wide range of operating conditions
- KU13.** dos and dont's of material handling and storage
- KU14.** whether any shading will occur and estimate its effect on the system
- KU15.** measuring solar irradiance with a pyranometer
- KU16.** effect of blocking and bypass diodes
- KU17.** basic functioning and operation of different types of inverters and other electrical components
- KU18.** do's and don'ts of DC wiring and installation of other electrical components
- KU19.** connection of the Solar Power Plant to the distribution box/ LT Panel and switchover along with precautions based on different types of plants
- KU20.** installation work on a solar power system in accordance with relevant standards and regulations
- KU21.** occupational health and safety (OHS) standards and associated risks when working on that particular site

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** complete documentation work applicable to the role
- GS2.** read English and/or vernacular language
- GS3.** read and understand manuals, health and safety instructions, memos, other company documents
- GS4.** read from different sources- books screens in machines and signage
- GS5.** read various color codes, as per standard electrical, mechanical and civil nomenclature
- GS6.** express statements or information clearly so that others can hear and understand
- GS7.** participate in and understand the main points of simple discussions

## Qualification Pack

- GS8.** respond appropriately to any queries
- GS9.** communicate with supervisor
- GS10.** complete documentation work applicable to the role
- GS11.** take decision as per systematic course of actions
- GS12.** plan and organize work to meet deadlines
- GS13.** work constructively and collaboratively with others
- GS14.** follow code of conduct
- GS15.** recognize problems and search for solutions
- GS16.** choose best methods to complete assigned tasks
- GS17.** approach relevant authority when required
- GS18.** apply domain knowledge, observations and data to select course of action to perform tasks related to solar photovoltaic systems
- GS19.** evaluate information obtained from customers, supervisor and co-workers to perform day to day activities
- GS20.** ask questions for better understanding

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Installation of Electrical components of a Solar PV System</i>	25	25	-	-
<b>PC1.</b> discuss how to implement site safety plan and inspect & utilise electrical installation toolkit and demonstrate how to install electrical components of solar PV system; including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.	2	3	-	-
<b>PC2.</b> identify tools and tackles for electrical component installation for Solar PV Power plant and demonstrate the application of tools & tackles used for cable and conduit installation.	2	3	-	-
<b>PC3.</b> describe the process of installing the electrical components including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.	2	-	-	-
<b>PC4.</b> explain the Do's and Don'ts of DC wiring and analyse how to perform DC wiring.	2	3	-	-
<b>PC5.</b> identify tools & tackles used for cable and conduit installation.	3	2	-	-
<b>PC6.</b> discuss and show how to ensure that the conduits and cables are properly supported, secured and labelled and demonstrate the application of tools & tackles used for cable and conduit installation.	3	3	-	-
<b>PC7.</b> describe the importance of Earthing for the protection of solar PV system and demonstrate how to perform earthing and grounding work for the protection of solar PV system.	2	3	-	-
<b>PC8.</b> explain the significance and types of earth faults as per standards.	3	-	-	-
<b>PC9.</b> explain the de-mounting of a solar PV power plant (after commissioning) and demonstrate demounting of solar PV power plant.	2	3	-	-



### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> discuss function and installation of Remote monitoring unit, Temperature and radiation sensor.	4	-	-	-
<b>PC11.</b> show how to clean the work area after completing the installation work.	-	5	-	-
<b>NOS Total</b>	<b>25</b>	<b>25</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N0104
<b>NOS Name</b>	Installation of electrical components of a solar PV system
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	Installation, Installation, Solar Panel Installation Technician, Technician
<b>NSQF Level</b>	4
<b>Credits</b>	1
<b>Version</b>	4.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	29/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### SGJ/N0105: Test and commission Solar PV system

#### Description

This unit is about testing and commissioning of electrical components of a solar photovoltaic system.

#### Scope

The scope covers the following :

- Test the system
- Commission the system

#### Elements and Performance Criteria

##### *Test and Commission Solar PV system*

To be competent, the user/individual on the job must be able to:

- PC1.** describe the importance of conducting visual inspection as part of pre commissioning activities and demonstrate how to perform testing of all components, along with fault finding & analysis, continuity checks, polarity check and other commissioning activities.
- PC2.** measure the Electrical data of string voltage, earthing.
- PC3.** explain how to prepare testing and inspection report and show how to perform visual inspection, inspect mechanical, civil and electrical components.
- PC4.** • perform the various test of all solar PV components:  
• • Continuity Test,  
• • Polarity check and other commissioning activities  
• and show how to verify polarity and check continuity of the system.
- PC5.** show how to measure and verify inverter operation including anti islanding performance and measurement of AC system values, DC voltage, current in each string, and array for system operation.
- PC6.** show how to verify workmanship and proficiency is using tools and equipment.
- PC7.** explain the concerned regulations & standards for grid interconnection and examine concerned regulations & standards for grid interconnection.
- PC8.** show how to initiate system startup procedures, measure and record voltage and other parameters, record anomaly and document changes.
- PC9.** describe the commissioning process for the solar PV system and demonstrate the commissioning process for the Solar PV System.

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and guidelines for working at height
- KU2.** information using appropriate corporate forms
- KU3.** authorization from specified field safety officer and supervisor

## Qualification Pack

- KU4.** legislative, organizational, site requirements and procedures
- KU5.** diagnostic/fault finding techniques
- KU6.** general terminologies associated with solar power plant
- KU7.** tools required for inspection and commissioning of the plant
- KU8.** effect on array output of current and voltage based on series / parallel connections of modules, tilt angle, orientation and shading
- KU9.** calculations to derive the power and energy received from solar radiation in a given area
- KU10.** efficiency, cost, typical specifications, functioning and operating principle of different types of commercially available PV modules, inverters, charge controllers, battery, cables, junction boxes and other electrical components
- KU11.** mechanical and electrical features necessary for the long life of the PV system under a wide range of operating conditions
- KU12.** type of mounting structure required depending on the type of roof
- KU13.** types of footing and fixtures required depending on the type of roof
- KU14.** dos and don'ts of material handling and storage
- KU15.** cabling route required
- KU16.** placement of array junction box and inverter
- KU17.** how to measure solar irradiance with a pyranometer
- KU18.** use of field measurements and sun path diagram
- KU19.** variation of current and voltage of a module w.r.t load
- KU20.** effect of blocking and bypass diodes
- KU21.** basic functioning and operation of different types of inverters and other electrical components
- KU22.** do's and don'ts of DC wiring and installation of other electrical components
- KU23.** connection of the Solar Power Plant to the distribution box/ LT Panel and switchover along with precautions based on different types of plants
- KU24.** installation work on a PV power system in accordance with relevant standards and regulations
- KU25.** testing and commissioning activities and its interpretation - visual inspection, continuity of wiring, earthing, polarity check, insulation and voltage drop
- KU26.** measurement of losses in a PV system at different points and interpretation of the results
- KU27.** typical faults, their causes and resolution for all system components
- KU28.** occupational health and safety (OHS) standards and associated risks when working on that particular site
- KU29.** statutory documentation relevant to safety and hygiene
- KU30.** compliance with all statutory and technical guidelines and best practices

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** complete documentation applicable to the role
- GS2.** read English and/or vernacular language

## Qualification Pack

- GS3.** read and understand manuals, health and safety instructions, memos, other company documents
- GS4.** read from different sources- books screens in machines and signage
- GS5.** read various color codes, as per standard electrical, mechanical and civil nomenclature
- GS6.** express statements or information clearly so that others can hear and understand
- GS7.** participate in and understand the main points of simple discussions
- GS8.** respond appropriately to any queries
- GS9.** follow organization's rule-based decision making process
- GS10.** take decision with systematic course of actions and/or response
- GS11.** organize work to meet deadlines
- GS12.** work constructively and collaboratively with others
- GS13.** follow code of conduct
- GS14.** manage relationships with customers with intent on satisfying its requirements for service delivery
- GS15.** recognize problems
- GS16.** choose best methods to complete assigned tasks
- GS17.** approach relevant authority when required
- GS18.** apply domain knowledge, observations and data to select course of action to perform tasks related to solar photovoltaic systems
- GS19.** evaluate information obtained from customers, supervisor and co-workers to perform day to day activities
- GS20.** ask questions for better understanding

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Test and Commission Solar PV system</i>	20	30	-	-
<b>PC1.</b> describe the importance of conducting visual inspection as part of pre commissioning activities and demonstrate how to perform testing of all components, along with fault finding & analysis, continuity checks, polarity check and other commissioning activities.	2	3	-	-
<b>PC2.</b> measure the Electrical data of string voltage, earthing.	4	-	-	-
<b>PC3.</b> explain how to prepare testing and inspection report and show how to perform visual inspection, inspect mechanical, civil and electrical components.	2	3	-	-
<b>PC4.</b> • perform the various test of all solar PV components: • • Continuity Test, • • Polarity check and other commissioning activities • and show how to verify polarity and check continuity of the system.	4	3	-	-
<b>PC5.</b> show how to measure and verify inverter operation including anti islanding performance and measurement of AC system values, DC voltage, current in each string, and array for system operation.	-	5	-	-
<b>PC6.</b> show how to verify workmanship and proficiency is using tools and equipment.	-	4	-	-
<b>PC7.</b> explain the concerned regulations & standards for grid interconnection and examine concerned regulations & standards for grid interconnection.	4	4	-	-
<b>PC8.</b> show how to initiate system startup procedures, measure and record voltage and other parameters, record anomaly and document changes.	-	4	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC9.</b> describe the commissioning process for the solar PV system and demonstrate the commissioning process for the Solar PV System.	4	4	-	-
<b>NOS Total</b>	<b>20</b>	<b>30</b>	-	-



## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N0105
<b>NOS Name</b>	Test and commission Solar PV system
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	Testing & Commissioning
<b>NSQF Level</b>	4
<b>Credits</b>	1
<b>Version</b>	4.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	29/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### SGJ/N0106: Maintain Personal Health & Safety at project site

#### Description

This unit is about maintaining health, safety and hygiene at workplace.

#### Scope

The scope covers the following :

- Adopt safe practices at workplace
- Follow emergencies, rescue and first aid procedures
- Follow good housekeeping practices and infection control guidelines

#### Elements and Performance Criteria

##### *Maintain Personal Health & Safety at project site*

To be competent, the user/individual on the job must be able to:

- PC1.** explain the requirements for safe work area.
- PC2.** explain the importance of administering first aid and demonstrate how to administer first aid.
- PC3.** identify the personal protective equipment used for the specific purpose and demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work.
- PC4.** identify the hazards associated with photovoltaic installations and show how to follow recommended safe practices in handling physical, chemical, electrical and fire hazards and risk.
- PC5.** identify and report any hazards, risks or breaches in site safety to the appropriate authority.
- PC6.** identify work safety procedures and instructions for working at height and show how to handle all required tools, tackles, materials and equipment safely.
- PC7.** explain how to use safety signs, labels, charts and notices at workplace.
- PC8.** explain the importance of Occupational health & Safety standards and regulations for installation of Solar PV system.
- PC9.** show how to use appropriate fire extinguishers for different types of fire.
- PC10.** incorporate good housekeeping practices and infection control guidelines and demonstrate good housekeeping and infection control & prevention practices.
- PC11.** show how to administer first aid to a victim and use correct method to move injured person during an emergency.
- PC12.** show how to report immediately to concerned authorities regarding sign and symptoms of illness of self and other colleagues.

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** importance of safety drills

## Qualification Pack

- KU2.** importance of working in clean and safe environment
- KU3.** health and safety roles and responsibilities of relevant personnel within and outside the organization
- KU4.** reporting procedures in case of breaches or hazards for site safety, accidents and emergency situations
- KU5.** basic ergonomic principle
- KU6.** key internal and external source of health and safety information
- KU7.** meaning of hazards, risk and near miss
- KU8.** importance of Personal Protective Equipment required for specific job
- KU9.** forms and classification of hazardous substances
- KU10.** health effect associated with exposure to environmental pollution
- KU11.** housekeeping activities relevant to task
- KU12.** symptoms of infection like fever, cough, swelling and inflammation

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** record data on waste disposal at workplace
- GS2.** complete statutory documents relevant to safety and hygiene
- GS3.** fill safety formats for near miss, unsafe condition
- GS4.** identify potential safety risk and report to appropriate authority
- GS5.** communicate and collaborate with others to incorporate sustainable practices
- GS6.** interpret general safety guidelines, labels, charts and signage

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain Personal Health &amp; Safety at project site</i>	25	25	-	-
<b>PC1.</b> explain the requirements for safe work area.	2	-	-	-
<b>PC2.</b> explain the importance of administering first aid and demonstrate how to administer first aid.	3	3	-	-
<b>PC3.</b> identify the personal protective equipment used for the specific purpose and demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work.	2	2	-	-
<b>PC4.</b> identify the hazards associated with photovoltaic installations and show how to follow recommended safe practices in handling physical, chemical, electrical and fire hazards and risk.	2	2	-	-
<b>PC5.</b> identify and report any hazards, risks or breaches in site safety to the appropriate authority.	2	-	-	-
<b>PC6.</b> identify work safety procedures and instructions for working at height and show how to handle all required tools, tackles, materials and equipment safely.	2	2	-	-
<b>PC7.</b> explain how to use safety signs, labels, charts and notices at workplace.	4	-	-	-
<b>PC8.</b> explain the importance of Occupational health & Safety standards and regulations for installation of Solar PV system.	4	-	-	-
<b>PC9.</b> show how to use appropriate fire extinguishers for different types of fire.	-	3	-	-
<b>PC10.</b> incorporate good housekeeping practices and infection control guidelines and demonstrate good housekeeping and infection control & prevention practices.	4	3	-	-
<b>PC11.</b> show how to administer first aid to a victim and use correct method to move injured person during an emergency.	-	5	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12.</b> show how to report immediately to concerned authorities regarding sign and symptoms of illness of self and other colleagues.	-	5	-	-
<b>NOS Total</b>	<b>25</b>	<b>25</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N0106
<b>NOS Name</b>	Maintain Personal Health & Safety at project site
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Renewable Energy
<b>Occupation</b>	PV System Installation Engineer
<b>NSQF Level</b>	5
<b>Credits</b>	1
<b>Version</b>	5.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	29/05/2027
<b>NSQF Clearance Date</b>	30/05/2024

## Qualification Pack

### DGT/VSQ/N0102: Employability Skills (60 Hours)

#### Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

#### Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

#### Elements and Performance Criteria

##### *Introduction to Employability Skills*

To be competent, the user/individual on the job must be able to:

- PC1.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

##### *Constitutional values - Citizenship*

To be competent, the user/individual on the job must be able to:

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

##### *Becoming a Professional in the 21st Century*

To be competent, the user/individual on the job must be able to:

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

##### *Basic English Skills*

To be competent, the user/individual on the job must be able to:



## Qualification Pack

- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

### *Career Development & Goal Setting*

To be competent, the user/individual on the job must be able to:

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

### *Communication Skills*

To be competent, the user/individual on the job must be able to:

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

### *Diversity & Inclusion*

To be competent, the user/individual on the job must be able to:

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

### *Financial and Legal Literacy*

To be competent, the user/individual on the job must be able to:

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

### *Essential Digital Skills*

To be competent, the user/individual on the job must be able to:

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e- mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

### *Entrepreneurship*

To be competent, the user/individual on the job must be able to:

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

### *Customer Service*

To be competent, the user/individual on the job must be able to:

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.

## Qualification Pack

**PC28.** follow appropriate hygiene and grooming standards

*Getting ready for apprenticeship & Jobs*

To be competent, the user/individual on the job must be able to:

**PC29.** create a professional Curriculum vitae (Résumé)

**PC30.** search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

**PC31.** apply to identified job openings using offline /online methods as per requirement

**PC32.** answer questions politely, with clarity and confidence, during recruitment and selection

**PC33.** identify apprenticeship opportunities and register for it as per guidelines and requirements

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

**KU1.** need for employability skills and different learning and employability related portals

**KU2.** various constitutional and personal values

**KU3.** different environmentally sustainable practices and their importance

**KU4.** Twenty first (21st) century skills and their importance

**KU5.** how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

**KU6.** importance of career development and setting long- and short-term goals

**KU7.** about effective communication

**KU8.** POSH Act

**KU9.** Gender sensitivity and inclusivity

**KU10.** different types of financial institutes, products, and services

**KU11.** how to compute income and expenditure

**KU12.** importance of maintaining safety and security in offline and online financial transactions

**KU13.** different legal rights and laws

**KU14.** different types of digital devices and the procedure to operate them safely and securely

**KU15.** how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

**KU16.** how to identify business opportunities

**KU17.** types and needs of customers

**KU18.** how to apply for a job and prepare for an interview

**KU19.** apprenticeship scheme and the process of registering on apprenticeship portal

## Generic Skills (GS)

User/individual on the job needs to know how to:

**GS1.** read and write different types of documents/instructions/correspondence

**GS2.** communicate effectively using appropriate language in formal and informal settings

## Qualification Pack

- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	<b>1</b>	<b>1</b>	-	-
<b>PC1.</b> identify employability skills required for jobs in various industries	-	-	-	-
<b>PC2.</b> identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values - Citizenship</i>	<b>1</b>	<b>1</b>	-	-
<b>PC3.</b> recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
<b>PC4.</b> follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	<b>2</b>	<b>4</b>	-	-
<b>PC5.</b> recognize the significance of 21st Century Skills for employment	-	-	-	-
<b>PC6.</b> practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	<b>2</b>	<b>3</b>	-	-
<b>PC7.</b> use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
<b>PC8.</b> read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
<b>PC9.</b> write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development &amp; Goal Setting</i>	<b>1</b>	<b>2</b>	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> understand the difference between job and career	-	-	-	-
<b>PC11.</b> prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	<b>2</b>	<b>2</b>	-	-
<b>PC12.</b> follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
<b>PC13.</b> work collaboratively with others in a team	-	-	-	-
<i>Diversity &amp; Inclusion</i>	<b>1</b>	<b>2</b>	-	-
<b>PC14.</b> communicate and behave appropriately with all genders and PwD	-	-	-	-
<b>PC15.</b> escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	<b>2</b>	<b>3</b>	-	-
<b>PC16.</b> select financial institutions, products and services as per requirement	-	-	-	-
<b>PC17.</b> carry out offline and online financial transactions, safely and securely	-	-	-	-
<b>PC18.</b> identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
<b>PC19.</b> identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	<b>3</b>	<b>4</b>	-	-
<b>PC20.</b> operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
<b>PC21.</b> use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
<b>PC22.</b> use basic features of word processor, spreadsheets, and presentations	-	-	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Entrepreneurship</i>	<b>2</b>	<b>3</b>	-	-
<b>PC23.</b> identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
<b>PC24.</b> develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
<b>PC25.</b> identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	<b>1</b>	<b>2</b>	-	-
<b>PC26.</b> identify different types of customers	-	-	-	-
<b>PC27.</b> identify and respond to customer requests and needs in a professional manner.	-	-	-	-
<b>PC28.</b> follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship &amp; Jobs</i>	<b>2</b>	<b>3</b>	-	-
<b>PC29.</b> create a professional Curriculum vitae (Résumé)	-	-	-	-
<b>PC30.</b> search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
<b>PC31.</b> apply to identified job openings using offline /online methods as per requirement	-	-	-	-
<b>PC32.</b> answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
<b>PC33.</b> identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
<b>NOS Total</b>	<b>20</b>	<b>30</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	DGT/VSQ/N0102
<b>NOS Name</b>	Employability Skills (60 Hours)
<b>Sector</b>	Cross Sectoral
<b>Sub-Sector</b>	Professional Skills
<b>Occupation</b>	Employability
<b>NSQF Level</b>	4
<b>Credits</b>	2
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/12/2021
<b>Next Review Date</b>	30/12/2026
<b>NSQC Clearance Date</b>	30/12/2021

## Assessment Guidelines and Assessment Weightage

### Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

## Qualification Pack

**Minimum Aggregate Passing % at QP Level : 70**

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

## Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
SGJ/N0101.Site survey for installation of solar PV system	57	43	0	0	100	29
SGJ/N0102.Procure Solar PV system components	32	18	0	0	50	15
SGJ/N0104.Installation of electrical components of a solar PV system	25	25	0	0	50	14
SGJ/N0105.Test and commission Solar PV system	20	30	0	0	50	14
SGJ/N0106.Maintain Personal Health & Safety at project site	25	25	0	0	50	14
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	14
<b>Total</b>	<b>179</b>	<b>171</b>	<b>-</b>	<b>-</b>	<b>350</b>	<b>100</b>



## Qualification Pack

### Acronyms

<b>NOS</b>	National Occupational Standard(s)
<b>NSQF</b>	National Skills Qualifications Framework
<b>QP</b>	Qualifications Pack
<b>TVET</b>	Technical and Vocational Education and Training

## Qualification Pack

### Glossary

<b>Sector</b>	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
<b>Scope</b>	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

## Qualification Pack

<b>Knowledge and Understanding (KU)</b>	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
<b>Organisational Context</b>	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
<b>Technical Knowledge</b>	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
<b>Core Skills/ Generic Skills (GS)</b>	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
<b>Electives</b>	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
<b>Options</b>	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.