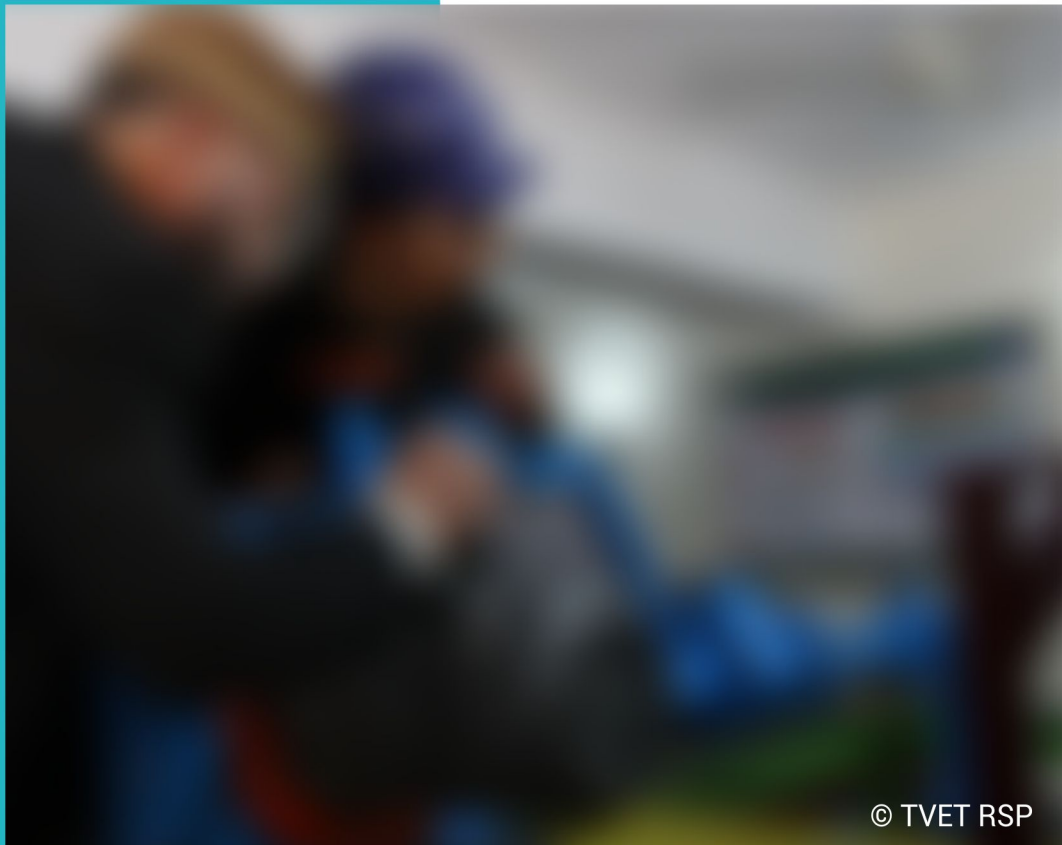


# BUILDING ELECTRICAL



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## ASSESSMENT PACKAGES

National Vocational Certificate Level 3

Version 1 - December 2014



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**Document Version**

December, 2014

**Islamabad, Pakistan**

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**ASSESSMENT PACKAGES**  
National Vocational Certificate Level 3

**Version 1 - December 2014**

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# 1

## ASSESSMENT SUMMARY AND RECORD

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	PORTFOLIO	OBSERVATION		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF: APPLY BUILDING ELECTRICIAN INSTALLATION SKILLS FOR SOLAR PV SYSTEMS		
Practical final project				✓	Complete supplied project brief related to application of Building Electrician installation skills for solar PV systems: <ul style="list-style-type: none"> <li>• Install three phase wiring to start a three phase motor(3-hp) by using star delta starter in workshop</li> <li>• Design and install 500 W off-grid solar PV System on roof/ground of workshop</li> </ul>		
Knowledge assessment	✓	✓			<ul style="list-style-type: none"> <li>• Answer all questions the Assessment Panel will have following oral presentation of completed project brief</li> </ul>		
Other requirements				✓	<ul style="list-style-type: none"> <li>• All completed course assignments, projects and formative assessments including:               <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> <li>✓ Oral presentation of project to assessment panel</li> <li>✓ Completed learner logbooks</li> <li>✓ Completed work forms/records</li> <li>✓ Completed job cards</li> <li>✓ Evidence of participating in training programs</li> <li>✓ Documented training outcomes such as reports and portfolio writing</li> <li>✓ Measuring instrument calibration records</li> </ul> </li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name..... Father Name .....

ALL WORK ASSESSED FOR THESE COMPETENCY STANDARDS MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following tasks within **five hours** timeframe:

- Install three phase wiring to start a three phase motor(3-hp) by using star delta starter in workshop
- Design and install 500 W off-grid solar PV System on roof/ground of workshop

ACTIVITIES	CANDIDATE RESPONSE
<p>1. Complete project brief of Install three phase wiring to start a three phase motor by using star delta starter in workshop under observation by Instructor</p> <p>2. Complete project brief of Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop under observation by Instructor</p>	<p>During a practical assessment, under observation by an assessor, I will correctly carry out:</p> <ul style="list-style-type: none"> <li>• <b>Install three phase wiring to start a three phase motor by using star delta starter in workshop</b> <ul style="list-style-type: none"> <li>✓ Draw wiring layout and measurements of three phase wiring.</li> <li>✓ Estimate materials including specifications, rating of three phase wiring components.</li> <li>✓ Select tools, equipment and materials for three phase wiring.</li> <li>✓ Install conduit, GI pipes, PVC pipes and/or ducts of three phase wiring.</li> <li>✓ Connect power cables, control cables (star delta starter) and fixtures of three phase wiring.</li> <li>✓ Inspect power and control wiring of three phase wiring.</li> <li>✓ Carry out testing of three phase wiring components and record results of three phase wiring.</li> <li>✓ Balance the load according to distribution priorities and load management at distribution box.</li> <li>✓ Commission of three phase wiring.</li> <li>✓ Carry out final quality inspection of three phase wiring.</li> <li>✓ Clean up and store tools, equipment and material of three phase wiring.</li> </ul> </li> <li>• <b>Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop</b> <ul style="list-style-type: none"> <li>✓ Conduct site visit to prepare plan for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Estimate materials including specifications and rating of components.</li> <li>✓ Select tools, equipment and materials.</li> <li>✓ Choose appropriate array frame for the roof type and determine and set correct tilt angle and adjustments for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Mark points for fixing of PV frame to install of 500 watt off-grid solar PV System.</li> <li>✓ Mount a photovoltaic array.</li> <li>✓ Install solar photovoltaic array and components in suitable location for installation of 500 watt off-grid solar PV System.</li> <li>✓ Connect PV panels and electrical components and minimize cable route length to minimize power loss.</li> <li>✓ Interpret and confirm installation as per drawing.</li> <li>✓ Arrange for earthing less than 5 ohm for 500 watt.</li> <li>✓ Carry out Electrical operational checks for 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Perform electrical Test (Voc, Ise,IL,VL) and adjust component/or parts of 500 watt off-grid solar PV System.</li> <li>✓ Perform final quality inspection of 500 watt off-grid solar PV System.</li> <li>✓ Install the load of 500 watt i.e. search light to determine the power required generation.</li> <li>✓ Commission the 500 watt off-grid solar PV System.</li> <li>✓ Clean up and store tools, equipment and materials of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul> </li> </ul>

<p><b>3. Present completed project brief supplied by Instructor</b></p>	<ul style="list-style-type: none"> <li>• Oral presentation of project brief and completed project work to Assessment Panel.</li> <li>• Presentation to include: <ul style="list-style-type: none"> <li>✓ Requirements of brief</li> <li>✓ Planning and preparation of project</li> <li>✓ Problems encountered and how they were dealt with</li> <li>✓ Project outcome/s</li> <li>✓ Lessons learnt from undertaking project (reflective thinking)</li> </ul> </li> <li>• Presentation to take no longer than 10 minutes</li> </ul>
<p><b>4. Answer all questions Assessor Panel will have following project presentation</b></p>	<p>My answers to questions are correct and demonstrate my understanding of the topics and their application.</p>

# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name ..... Father Name .....

### INSTRUCTIONS FOR ASSESSMENT PANEL

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

- This section contains minimum evidence requirement. Oral questioning may be used to clarify candidate understanding of the topic and its application.

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS ON CANDIDATE PERFORMANCE
1. Completes Practical task of all course assignments	<ul style="list-style-type: none"> <li>During a practical assessment under observation by an assessor the candidate correctly carried out the following task</li> </ul>		
<ul style="list-style-type: none"> <li>Install three phase wiring to start a three phase motor by using star delta starter in workshop</li> </ul>	<ul style="list-style-type: none"> <li>Install three phase wiring to start a three phase motor by using star delta starter in workshop</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Draw wiring layout and measurements of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Estimate materials including specifications, rating of three phase wiring components.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Select tools, equipment and materials for three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Install conduit, GI pipes, PVC pipes and/or ducts of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Connect power cables, control cables (star delta starter) and fixtures of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Inspect power and control wiring of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Carry out testing of three phase wiring components and record results of three phase wiring.</li> </ul>		
Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop	<ul style="list-style-type: none"> <li>✓ Balance the load according to distribution priorities and load management at distribution box.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Commission of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Carry out final quality inspection of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Clean up and store tools, equipment and material of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Conduct site visit to prepare plan for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Estimate materials including specifications and rating of components.</li> </ul>		
<ul style="list-style-type: none"> <li>✓ Select tools, equipment and materials.</li> </ul>			
<ul style="list-style-type: none"> <li>✓ Choose appropriate array frame for the roof type and determine and set correct tilt angle and adjustments for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>			



ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS ON CANDIDATE PERFORMANCE
	<ul style="list-style-type: none"> <li>✓ Mark points for fixing of PV frame to install of 500 watt off-grid solar PV System.</li> <li>✓ Mount a photovoltaic array.</li> <li>✓ Install solar photovoltaic array and components in suitable location for installation of 500 watt off-grid solar PV System.</li> <li>✓ Connect PV panels and electrical components and minimize cable route length to minimize power loss.</li> <li>✓ Interpret and confirm installation as per drawing.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Arrange for earthing less than 5 ohm for 500 watt.</li> <li>✓ Carry out Electrical operational checks for 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Perform electrical Test (Voc,Isc,IL,VL) and adjust component/or parts of 500 watt off-grid solar PV System.</li> <li>✓ Perform final quality inspection of 500 watt off-grid solar PV System.</li> <li>✓ Install the load of 500 watt i.e. search light to determine the power required generation.</li> <li>✓ Commission the 500 watt off-grid solar PV System.</li> <li>✓ Clean up and store tools, equipment and materials of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>		
<b>3. Present completed project brief to Assessment Panel</b>	<p>Oral presentation of project brief and completed project work to Assessment Panel.</p> <p>Presentation to include:</p> <ul style="list-style-type: none"> <li>• Requirements of brief</li> <li>• Planning and preparation of project</li> <li>• Problems encountered and how they were dealt with</li> <li>• Project outcome/s</li> <li>• Lesson learnt (reflective thinking)</li> </ul> <p>Presentation to take no longer than 10 minutes</p>		
<b>4. Answer all questions Assessment Panel will have following project presentation</b>	<p>Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application.</p> <p>Assessment Panel to document all questions asked, if any, and the answers here. Use extra pages as required and attach here.</p>		

# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

### Instructions

This section contains information regarding;

- Context of the assessment
- List of required tools and equipment's.
- List of consumable items required during the service

#### 1. Context of Assessment

This practical final project will be conducted in a Building Electrician's lab/workshop environment  
Required tools, equipment and consumables will vary according to project brief.

#### 2. List of tools and equipment required

S. No	Name of Items ( tools and equipment's)	Quantity (No's)
1	Safety Hamlet	5
2	Insulated Pliers With Side Cutter	5
3	Insulated Long Nose Pliers With Side Cutter	5
4	Insulated wire Cutter	5
5	wire strippers	5
6	insulated screw drivers	5
7	High Insulated Rubber Hand Gloves	5
8	Insulated Work Bench	5
9	Power Supply	5
10	Main Switch	5
11	Tag Off / Log Off Nos	5
12	Drawing Board	5
13	Papers for Drawing	5
14	Led Pencil	5
15	Measuring Steel Tape	5
16	Steel Rule	5
17	PVC Pipes Different Size	5
18	Insulated Plier With Side Cutter	5
19	Insulated Long Nose Plier With Side Cutter	5
20	Insulated wire Cutter	5
21	Blow Lamp	5
22	Hacksaw	5
23	Measuring Steel Tap	5
24	Steel Wire	5
25	Milled Steel Wire	5
26	Calulator	5
27	Measuring Steel Tape	5
27	Steel Rule	5
28	Drawing Board	5
29	Switch Board	5
30	Distribution Board	5
31	Steel Rule	5
32	Insulated Plier With Side Cutter	5
33	Insulated Long Nose Plier With Side Cutter	5
34	Insulated wire Cutter	5
35	Flat Screw Driver	5
36	Level tool	5

37	Hammer of 2 Kg	5
38	Tong Tester Metter	5
39	Calulator	5
40	Micrometre 0 To 1	5
41	Insulated Plier With Side Cutter	5
42	Insulated Long Nose Plier With Side Cutter	5
43	Insulated wire Cutter	5
44	Screw Driver Different Size	5
45	Micrometre 0 To 1	5
46	Calulator	5
47	Different Electrical Item	5
48	Watt meter	5
49	Micrometre/SWG Gauge	5
50	Chisel 8'	5
51	Hammer 2kg	5
52	Insulated Plier With Side Cutter	5
53	Insulated Long Nose Plier With Side Cutter	5
54	Insulated wire Cutter	5
55	Screw driver Different Size	5
56	Earth Electrode	5
57	Boring Machine	1
58	8 SWG Size Wire	5
59	Bus Bar	5
60	Screw Wrench	5
61	Spanner Set	5
62	Earth Tester Meter	5
63	Hertz Meter	5
64	Thimble Press	5
65	Charge Controller	5
66	Battery Charger	5
67	Tong Tester (Clamp-On Meter) AC/DC	5
68	Compass	5
69	Megar meter (Analogue & Digital)	2
70	PV panel 500 watts with Mount stand	5
71	Battery 100 AH	5
72	Magnetic contactor	25
73	Cam Switch (STAR-DELTA)	5
74	Overload relay	5

3. List of consumable items required		
S. No	Consumable Items	Quantity
1	safety shoes	5
2	Safety Eyes Glass	5
3	safety gloves	5
4	Dungaree	5
5	Phase tester	5
6	Insulated Rubber Mat	5
7	Samad Bond	1 pack
8	Tag Off / Log Off Nos	5
9	Map OHS Precautions	1

10	Documents Related Drawing	as per requirements
11	Papers for Drawing	15
12	Led Pencil	15
13	Rubber	15
14	Permanent Marker	10
15	Tag Off / Log Off Nos	15
16	Solution Pak	1 pack
17	joints boxes	15
18	PVC Pipes Different Size	5 length
19	fan boxes	15
20	junctions boxes	15
21	Ball Point	10
22	job related documents	as per requirements
23	Papers for Drawing	15
24	Led Pencil	15
25	Rubber	15
26	switch board	15
27	Distribution Board as per Required	15
28	Drawing Map	1
29	Power Plug (Male, Female)	15
30	Plastic Board	15
31	Light Plug and Box	15
32	Main Supply Cable	2 coil
33	Phase tester	5
34	TV and Telephone Box	15
35	Paper for Documentation	15
36	Light Plug	15
37	Switch Board	15
38	TV Plug with Board	15
39	Marker	15
40	Chisel	15
41	PVC pipes	5 length
42	Switch Board with Box	15
43	PVC elbow	15
44	PVC Socket	15
45	PVC clamp	15
46	Volt Metter	15
47	Paper	15
48	Ballpoint	15
49	Cable According to Specification	As per requirement
50	Cable Size Table	5
51	Insulation Tester	5
52	Distribution Board as per Required	5
53	Cable Specification Table	5
54	Nut Bolt	3 dozen different sizes
55	earth wire	as per requirements
56	Copper Bus Bar	5
57	Conduit Pipe/ PVC Pipe	5 length
58	Nut Bolt	3 dozen



<b>ASSESSMENT MATERIAL</b>  <b>EVIDENCE GUIDE</b>	<h1>LEN0123A.v1 Apply knowledge of entrepreneurial ideas</h1>																																
Qualification LEN0123.v1 Level: 3 Credit: 8 Version: 1																																	
CONTENTS	<ol style="list-style-type: none"><li>1. Assessment Summary and Record</li><li>2. Candidate Assessment</li><li>3. Assessor Judgement Guide</li><li>4. List of required tools/ equipment, material and context of assessment</li></ol>																																
ASSESSMENT AND ASSESSOR DETAILS	<table style="width: 100%;"><tr><td>Competent <input type="checkbox"/></td><td>Not Yet Competent <input type="checkbox"/></td></tr><tr><td>Assessment <input type="checkbox"/></td><td>Re-Assessment <input type="checkbox"/></td></tr><tr><td>Assessor Name: _____</td><td>Assessor Code _____</td></tr><tr><td>Assessor Signature _____</td><td>Date <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td style="text-align: center;">DD</td><td style="text-align: center;">MM</td><td colspan="6"></td><td style="text-align: center;">YYYY</td></tr></table></td></tr></table>	Competent <input type="checkbox"/>	Not Yet Competent <input type="checkbox"/>	Assessment <input type="checkbox"/>	Re-Assessment <input type="checkbox"/>	Assessor Name: _____	Assessor Code _____	Assessor Signature _____	Date <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td style="text-align: center;">DD</td><td style="text-align: center;">MM</td><td colspan="6"></td><td style="text-align: center;">YYYY</td></tr></table>											DD	MM							YYYY					
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ASSESSMENT RESULTS SUMMARY FORM	You can use this coversheet as an <i>Assessment Results Summary Form</i> . Simply post a photocopy of this completed coversheet to NAVTTC																																
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# 1

## ASSESSMENT SUMMARY & RECORD

CANDIDATE NAME:

FATHER NAME:

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	OBSERVATION	PORTFOLIOS		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF COMPETENCY STANDARD: APPLY KNOWLEDGE OF ENTREPRENEURIAL IDEAS		
Practical skill demonstration			✓		<ul style="list-style-type: none"> <li>Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead.</li> </ul>		
Knowledge Assessment	✓	✓			<ul style="list-style-type: none"> <li>Answer all questions in the knowledge assessment on the following topics:               <ul style="list-style-type: none"> <li>✓ Demonstrate knowledge of the requirements of entrepreneurs</li> <li>✓ Conduct business start-up activities</li> <li>✓ Develop a financial strategy</li> <li>✓ Develop a marketing strategy</li> <li>✓ Implement and control business financial strategy</li> </ul> </li> </ul>		
Other Requirements		✓	✓	✓	<ul style="list-style-type: none"> <li>All candidate formative assessments completed by Instructor including:               <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>All work produced as module projects and assignments</li> <li>Completed learner logbooks</li> <li>Completed work records</li> <li>Evidence of development of business plan which includes:               <ul style="list-style-type: none"> <li>✓ Financial plan</li> <li>✓ Service and product delivery</li> <li>✓ Marketing strategy</li> </ul> </li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name:

Father Name:

ALL WORK ASSESSED IN THIS COMPETENCY STANDARD MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following practical tasks within set timeframe of one hour:

- Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead.

ACTIVITIES	CANDIDATE RESPONSE
<p>1. Complete practical task to Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead Under observation by an assessor</p>	<p>During a practical assessment, under observation by an assessor, I will correctly :</p> <ul style="list-style-type: none"> <li>• Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead.               <ul style="list-style-type: none"> <li>✓ Estimate the material to be used for the 2 KW solar system installation</li> <li>✓ Calculate the Labour cost for installation of 2 KW solar system</li> <li>✓ Incorporate the contingency of 2% for installation of 2 KW solar system</li> <li>✓ Incorporate the overheads and profit margin for installation of 2 KW solar system</li> </ul> </li> </ul>
<p>1. Complete knowledge assessment</p>	<p>Answer all questions in the knowledge assessment on the following topics:</p> <ul style="list-style-type: none"> <li>• Importance of entrepreneurship               <ul style="list-style-type: none"> <li>✓ Identify the importance of entrepreneurs for Pakistan</li> <li>✓ Identify challenges of being an entrepreneur</li> <li>✓ Confirm and implement strategies for improving personal entrepreneurship qualities</li> </ul> </li> <li>• Conducting business start-up activities               <ul style="list-style-type: none"> <li>✓ Select and secure business premises</li> <li>✓ Secure business operating clearance</li> <li>✓ Secure business support service</li> </ul> </li> <li>• Developing a financial strategy               <ul style="list-style-type: none"> <li>✓ Project profit and loss and cash flow including total cost of set-up</li> <li>✓ Identify sources of funding</li> <li>✓ Establish and follow bank requirements</li> </ul> </li> <li>• Developing a marketing strategy               <ul style="list-style-type: none"> <li>✓ Identify potential profitable opportunities and target markets</li> <li>✓ Plan service and product delivery</li> <li>✓ Identify competitors operating in the industry</li> <li>✓ Identify methods of promotion</li> </ul> </li> <li>• Implementing and controlling business financial strategy               <ul style="list-style-type: none"> <li>✓ Implement financial control system to maintain business cash and general liquidity</li> <li>✓ Prepare financial statements and interpret results</li> <li>✓ Prepare and implement periodic plans and budgets</li> </ul> </li> </ul>

<b>2. Other requirements</b>	<ul style="list-style-type: none"><li>• All candidate formative assessments completed by Instructor including:<ul style="list-style-type: none"><li>✓ Observations</li><li>✓ Demonstrations</li><li>✓ Questions and recorded answers</li></ul></li><li>• All work produced as module projects and assignments</li><li>• Completed learner logbooks</li><li>• Completed work records</li><li>• Evidence of development of business plan which includes:<ul style="list-style-type: none"><li>✓ Financial plan</li><li>✓ Service and product delivery</li><li>✓ Marketing strategy</li></ul></li></ul>
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# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name:

Father Name:

### INSTRUCTIONS FOR ASSESSOR

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

Oral questioning may be used to clarify candidate understanding of the topic and its application.

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS
1. Completes practical task Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead. under observation by an assessor	During a practical assessment, under observation by an assessor, the candidate correctly:		
	<ul style="list-style-type: none"> <li>Prepare a financial plan for 2 KW solar system installations on roof with 10% profit and 15% overhead.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Estimated the material to be used for the 2 KW solar system installation</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Calculated the Labour cost for installation of 2 KW solar system</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Incorporated the contingency of 2% for installation of 2 KW solar system</li> </ul>		
2. Knowledge assessment	Answer all questions in the knowledge assessment on the following topics:		
	<ul style="list-style-type: none"> <li>Requirements of entrepreneurs</li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify the importance of entrepreneurs for Pakistan</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify challenges of being an entrepreneur</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Confirm and implement strategies for improving personal entrepreneurship qualities</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li>Conducting business start-up activities</li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Select and secure business premises</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Secure business operating clearance</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Secure business support service</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li>Developing a financial strategy</li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Project profit and loss and cash flow including total cost of set-up</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify sources of funding</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Establish and follow bank requirements</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li>Developing a marketing strategy</li> </ul>		
	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify potential profitable opportunities and target markets</li> </ul> </li> </ul>		
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Plan service and product delivery</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify competitors operating in the industry</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Identify methods of promotion</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li>Implementing and controlling business financial strategy</li> </ul>			
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Implement financial control system to maintain business cash and general liquidity</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>✓ Prepare financial statements and interpret results</li> </ul> </li> </ul>			

	<ul style="list-style-type: none"> <li>✓ Prepare and implement periodic plans and budgets</li> </ul>			
3. Other requirements	<ul style="list-style-type: none"> <li>• All candidate formative assessments completed by Instructor including; <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>• All work produced as module projects and assignments</li> <li>• Completed learner logbooks</li> <li>• Completed work records</li> </ul>			

# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

<b>Instructions</b>	This section contains information regarding; <ul style="list-style-type: none"><li>• Context of the assessment</li><li>• List of required tools and equipment.</li><li>• List of consumable items required during the service</li></ul>
1. Context of Assessment	This practical skill demonstration will be conducted in a Building Electrician's lab/workshop environment

2. List of consumable items required		
S. No	Consumable and non-consumable Items	Quantity
1	A 4 Papers	05 each
2	Led Pencil's	05 each
3	Eraser	05 each
4	Sharpener	05 each
5	Ruler	05 each
6	Highlighter	05 each



# 1

## ASSESSMENT SUMMARY & RECORD

CANDIDATE NAME:

FATHER NAME:

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	OBSERVATION	PORTFOLIOS		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF COMPETENCY STANDARD: PLAN WORK AND CALCULATE COST		
Practical skill demonstration			✓		<ul style="list-style-type: none"> <li>Draw layouts and sketches for electrical duct wiring of a room.</li> <li>Calculate material and labour cost of electrical duct wiring of a room</li> </ul>		
Knowledge Assessment	✓	✓			<ul style="list-style-type: none"> <li>Answer any questions your assessor may have for you during the practical skill demonstration</li> </ul>		
Other Requirements			✓	✓	<ul style="list-style-type: none"> <li>All candidate formative assessments completed by Instructor including:                             <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>All work completed as module assignments and projects including:                             <ul style="list-style-type: none"> <li>✓ Drawings and sketches of wiring layouts</li> <li>✓ Calculations of materials, labour costs, input and output voltage measurements</li> </ul> </li> <li>Completed work records</li> <li>Completed learner logbooks</li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name:

Father Name:

ALL WORK ASSESSED IN THIS COMPETENCY STANDARD MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following practical tasks within set timeframe of Two Hours:

- Draw layouts and sketches for electrical duct wiring of a room.
- Calculate material and labour cost of electrical duct wiring of a room

ACTIVITIES	CANDIDATE RESPONSE
1. Complete practical assessment	<p>During a practical assessment, under observation by an assessor, I will correctly:</p> <ul style="list-style-type: none"><li>• Draw layouts and sketches for open wiring of a room.<ul style="list-style-type: none"><li>✓ Identify and obtain safety and other regulatory requirements as per job requirement</li><li>✓ Interpret and confirm layout plan</li><li>✓ Identify distribution points</li></ul></li><li>• Calculate material and labour cost for open wiring of a room.<ul style="list-style-type: none"><li>✓ Identify location for installation</li><li>✓ Estimate material requirements derived from produced drawing or sketch</li><li>✓ Produce estimated overall cost for installation including labour cost</li><li>✓ Meet set timeframes required to plan and calculate costs for produced drawing or sketch</li></ul></li></ul>
2. Complete knowledge assessment	<p>Answer all questions my assessor may have during the practical assessment</p>
3. Other requirements	<ul style="list-style-type: none"><li>• All candidate formative assessments completed by Instructor including;<ul style="list-style-type: none"><li>✓ Observations</li><li>✓ Demonstrations</li><li>✓ Questions and recorded answers</li></ul></li><li>• All work completed as module assignments and projects including:<ul style="list-style-type: none"><li>✓ Drawings and sketches of wiring layouts</li><li>✓ Calculations of materials, labour costs, input and output voltage measurements</li></ul></li><li>• Completed work records</li><li>• Completed learner logbooks</li></ul>

# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name:

Father Name:

### INSTRUCTIONS FOR ASSESSOR

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

The supplied electrical appliance and products requiring maintenance must meet the evidence requirements of the candidate's competence in installing electrical products and appliances

Set timeframe for practical skill demonstration must reflect the commercially viable timeframe for the tasks.

Oral questioning may be used to clarify candidate understanding of the topic and its application

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS
1. Completed practical assessment	During a practical assessment, under observation by an assessor, the candidate correctly:		
	<ul style="list-style-type: none"> <li>Drawn layouts and sketches for electrical duct wiring of a room.                             <ul style="list-style-type: none"> <li>✓ Identified and obtain safety and other regulatory requirements as per job requirement</li> <li>✓ Interpreted and confirm layout plan</li> <li>✓ Identified distribution points</li> </ul> </li> </ul>		
	<ul style="list-style-type: none"> <li>Calculate material and labour cost for electrical duct wiring of a room.                             <ul style="list-style-type: none"> <li>✓ Identified location for installation</li> <li>✓ Estimated material requirements derived from produced drawing or sketch</li> <li>✓ Produced and estimated overall cost for installation including labour cost</li> <li>✓ Meeting set timeframes required to plan and calculate costs for produced drawing or sketch</li> </ul> </li> </ul>		
2. Knowledge assessment	<p>Candidate's answers to questions are correct and demonstrate understanding of the topics and their application.</p> <p><i>Assessor to document below all questions asked and candidate answers. Use extra sheets if required and attached.</i></p>		
3. Other requirements	<ul style="list-style-type: none"> <li>All candidate formative assessments completed by Instructor including:                             <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>All work completed as module assignments and projects including:                             <ul style="list-style-type: none"> <li>✓ Drawings and sketches of wiring layouts</li> <li>✓ Calculations of materials, labour costs, input and output voltage measurements</li> </ul> </li> <li>Completed work records</li> <li>Completed learner logbooks</li> </ul>		

# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

<b>Instructions</b>	This section contains information regarding; <ul style="list-style-type: none"><li>• Context of the assessment</li><li>• List of required tools and equipment.</li><li>• List of consumable items required during the service</li></ul>
1. Context of Assessment	This practical skill demonstration will be conducted in a Building Electrician's lab/workshop environment  The Assessor will select the required tools, equipment and consumables from the list below for the assessment

2. List of tools and equipment required		
S. No	Tools and equipment	Quantity
1	A 4 Papers	
2	Led Pencil's	
3	Eraser	
4	Sharpener	
5	Ruler	
6	Calculator	
7	Ball Pen	





<b>ASSESSMENT MATERIAL</b>  <b>EVIDENCE GUIDE</b>	<h1>LEN0123C.v1 Install three-phase wiring</h1>
<b>Qualification</b> LEN0142.v1 <b>Level:</b> 3 <b>Credit:</b> 20 <b>Version:</b> 1	

<b>CONTENTS</b>	1. Assessment Summary and Record 2. Candidate Assessment 3. Assessor Judgement Guide 4. List of required tools/ equipment, material and context of assessment
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<b>ASSESSMENT AND ASSESSOR DETAILS</b>	<b>Competent</b> <input type="checkbox"/>	<b>Not Yet Competent</b> <input type="checkbox"/>																
	<b>Assessment</b> <input type="checkbox"/>	<b>Re-Assessment</b> <input type="checkbox"/>																
	<b>Assessor Name:</b> _____	<b>Assessor Code</b> _____																
	<b>Assessor Signature</b> _____	<b>Date</b> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center; font-size: 8px;">DD</td> <td style="text-align: center; font-size: 8px;">MM</td> <td colspan="4"></td> <td style="text-align: center; font-size: 8px;">YYYY</td> </tr> </table>											DD	MM				
DD	MM					YYYY												

<b>CANDIDATE DETAILS</b>	<b>Candidate Name:</b> _____ <small style="display: flex; justify-content: space-between; width: 100%;"> <span>First Name</span> <span>Last Name</span> </small>																				
	<b>Father Name</b> _____																				
	<b>Institute Name and District</b> _____																				
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	<b>OR</b>																				
	<b>Registration Number:</b> _____																				
<b>Gender</b> Male <input type="checkbox"/> Female <input type="checkbox"/>																					
<b>Candidate Consent</b> I agree to the time and date of the assessment and am aware of the requirements of the assessment. I fully understand my rights of appeal.																					
<b>Candidate Signature:</b> _____																					

<b>ASSESSMENT RESULTS SUMMARY FORM</b>	You can use this coversheet as an <i>Assessment Results Summary Form</i> . Simply post a photocopy of this completed coversheet to NAVTTC
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NAVTTC OFFICE ONLY	1. DATE FORM RECEIVED: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center; font-size: 8px;">DD</td> <td style="text-align: center; font-size: 8px;">MM</td> <td colspan="2"></td> <td style="text-align: center; font-size: 8px;">YYYY</td> </tr> </table>								DD	MM			YYYY	2. DATE ENTERED INTO DATABASE: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center; font-size: 8px;">DD</td> <td style="text-align: center; font-size: 8px;">MM</td> <td colspan="2"></td> <td style="text-align: center; font-size: 8px;">YYYY</td> </tr> </table>								DD	MM			YYYY	
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# 1

## ASSESSMENT SUMMARY & RECORD

CANDIDATE NAME:

FATHER NAME:

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	OBSERVATION	PORTFOLIOS		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF COMPETENCY STANDARD: INSTALL THREE-PHASE WIRING		
Practical skill demonstration			✓		<ul style="list-style-type: none"> <li>Plan 3 Phase wiring layout of a machine hall</li> <li>Lay cables according to the plan</li> <li>Perform wiring test i.e. continuity, phase sequence and insulation test on laid wiring</li> </ul>		
Knowledge Assessment		✓			<ul style="list-style-type: none"> <li>Answer any questions your assessor may have for you during the practical skill demonstration</li> </ul>		
Other Requirements	✓	✓	✓	✓	<ul style="list-style-type: none"> <li>All candidate formative assessments completed by Instructor including:                             <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>All work completed as module assignments and projects including:                             <ul style="list-style-type: none"> <li>✓ Material estimates</li> <li>✓ Completed wiring layout</li> <li>✓ Documented wiring test results</li> <li>✓ Work related documents and procedures</li> </ul> </li> <li>Completed work records</li> <li>Completed learner logbooks</li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name:

Father Name:

ALL WORK ASSESSED IN THIS COMPETENCY STANDARD MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following practical tasks within set timeframe:

- Install 3 phase 5 HP motor with star delta starter.
- Lay cables and equipment as per given plan.
- Perform wiring test i.e. continuity, phase sequence and insulation test on laid wiring.
- Perform commissioning of 3 phase 5 HP motor with star delta starter.

ACTIVITIES	CANDIDATE RESPONSE
<p>1. Complete practical assessment of Install 3 phase 5 HP motor with star delta starter under observation by an assessor</p>	<p>During an assessment by an Assessor I will correctly carry out:</p> <ul style="list-style-type: none"> <li>• Install 3 phase 5 HP motor with star delta starter.               <ul style="list-style-type: none"> <li>✓ Draw wiring layout including distance to connection points measurements</li> <li>✓ Estimate materials including specifications</li> <li>✓ Prepare tools, equipment and materials</li> </ul> </li> <li>• Lay cables and equipment as per given plan.               <ul style="list-style-type: none"> <li>✓ Prepare cable and equipment installation</li> <li>✓ Install conduit, GI pipes, PVC pipes and/or ducts, DB.</li> <li>✓ Connect cables and Points as per given plan</li> </ul> </li> <li>• Perform wiring test i.e. continuity, phase sequence and insulation test on laid wiring.               <ul style="list-style-type: none"> <li>✓ Inspect wiring and distribution board</li> <li>✓ Carry out testing procedures and document results</li> </ul> </li> <li>• Perform commissioning of 3 phase 5 HP motor with star delta starter.               <ul style="list-style-type: none"> <li>✓ Perform pre commissioning tests on 3 phases 5 HP motor.</li> <li>✓ Perform different operations on 3 phases 5 HP motor.</li> <li>✓ Commission the 3 phases 5 HP motor with star delta starter</li> </ul> </li> </ul>
<p>2. Complete knowledge assessment</p>	<p>Answer all questions my assessor may have during the practical assessment</p>
<p>3. Other requirements</p>	<ul style="list-style-type: none"> <li>• All candidate formative assessments completed by Instructor including:           <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>• All work completed as module assignments and projects including:           <ul style="list-style-type: none"> <li>✓ Material estimates and specifications</li> <li>✓ Completed wiring layout</li> <li>✓ Documented wiring test results</li> <li>✓ Work related documents and procedures</li> </ul> </li> <li>• Completed work records</li> <li>• Completed learner logbooks</li> </ul>

# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name:

Father Name:

### INSTRUCTIONS FOR ASSESSOR

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

Set timeframe for practical skill demonstration must be adequate for candidate to install three-phase wiring in the commercially viable timeframes for the tasks.

Oral questioning may be used to clarify candidate understanding of the topic and its application.

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS
1. Completed practical assessment of Install 3 phase 5 HP motor with star delta starter. Under observation by an assessor	<p>During a practical assessment, under observation by an assessor, the candidate correctly:</p> <ul style="list-style-type: none"> <li>• Installed 3 phase 5 HP motor with star delta starter.               <ul style="list-style-type: none"> <li>✓ Drawn wiring layout including distance to connection points measurements</li> <li>✓ Estimated materials including specifications</li> <li>✓ Prepared tools, equipment and materials</li> </ul> </li> <li>• Laid cables and equipment as per given plan.               <ul style="list-style-type: none"> <li>✓ Prepared cable and equipment installation</li> <li>✓ Installed conduit, GI pipes, PVC pipes and/or ducts, DB.</li> <li>✓ Connect cables and earth points as per given plan</li> </ul> </li> <li>• Performed wiring test i.e. continuity, phase sequence and insulation test on laid wiring.               <ul style="list-style-type: none"> <li>✓ Inspect wiring and distribution board</li> <li>✓ Carry out testing procedures and document results</li> </ul> </li> <li>• Performed commissioning of 3 phase 5 HP motor with star delta starter.               <ul style="list-style-type: none"> <li>✓ Performed pre commissioning tests on 3 phases 5 HP motor.</li> <li>✓ Performed different operations on 3 phases 5 HP motor.</li> <li>✓ Commissioned the 3 phases 5 HP motor with star delta starter</li> </ul> </li> </ul>		
2. Knowledge assessment	<p>Candidate's answers to questions are correct and demonstrate understanding of the topics and their application.</p> <p><i>Assessor to document below all questions asked and candidate answers. Use extra sheets if required and attached.</i></p>		
3. Other requirements	<ul style="list-style-type: none"> <li>• All candidate formative assessments completed by Instructor including:               <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>• All work completed as module assignments and projects including:               <ul style="list-style-type: none"> <li>✓ Material estimates and specifications</li> <li>✓ Completed wiring layout</li> <li>✓ Documented wiring test results</li> </ul> </li> </ul>		

	<ul style="list-style-type: none"><li>✓ Work related documents and procedures</li><li>• Completed work records</li><li>• Completed learner logbooks</li></ul>			
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# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

<b>Instructions</b>	This section contains information regarding; <ul style="list-style-type: none"> <li>• Context of the assessment</li> <li>• List of required tools and equipment.</li> <li>• List of consumable items required during the service</li> </ul>
1. Context of Assessment	This practical skill demonstration will be conducted in a Building Electrician's lab/workshop environment The Assessor will select the required tools, equipment and consumables from the list below for the assessment

2. List of tools and equipment required		
S. No	Tools and equipment	Quantity
1	Personal protective equipment	05 No's
2	Fire extinguishers	05 No's
3	First aid box	05 No's
4	Adjustable wrench	05 No's
5	Amp meter	05 No's
6	AVO meter	05 No's
9	Bench vice	05 No's
10	Ceiling hole cutter	05 No's
11	Charge controller	05 No's
12	Chisel	05 No's
13	Clamp on meter	05 No's
14	Compass	05 No's
15	Cutter	05 No's
16	Drill machine	05 No's
17	Earth tester meter	05 No's
18	Extension board	05 No's
19	File set	05 No's
21	Gloves	05 No's
22	Goggles	05 No's
23	Grinder	05 No's
24	Hammer	05 No's
25	Hand drill machine	05 No's
26	Helmet	05 No's
28	Hex saw	05 No's
29	Knife (cable)	05 No's
30	Level	05 No's
31	L-key set	05 No's
32	Lock plier	05 No's
33	Measuring tape	05 No's
34	Megger meter (Analog & Digital)	05 No's
35	Micrometre	05 No's
36	Multimeter	05 No's
37	Number punch	05 No's
38	Phase sequence meter	05 No's
39	Pipe cutter	05 No's
40	Pipe vice	05 No's
42	Plier set	05 No's
43	Punching tool (Networking /Telephone)	05 No's
44	Ratchet set	05 No's
45	Safety boots	05 No's
46	Scissor	05 No's
47	Screw driver set	05 No's
48	Soldering iron	05 No's
49	Spanner set	05 No's
50	Steel scale	05 No's

51	Steel wire	05 No's
52	synchronizing meter	05 No's
53	Tachometer	05 No's
54	Tester	05 No's
55	Thimble press	05 No's
56	Tong tester (clamp-on meter) AC/DC	05 No's
57	Torch	05 No's
58	Vernier calliper	05 No's
59	Volt meter	05 No's
60	Wire gauge	05 No's
61	Wood saw	05 No's

3. List of consumable items required		
S. No	Consumable Items	Quantity
1	Cable 3 / .029"	As Required
2	Cable 7 / .029"	As Required
3	Cable 1 / .036"	As Required
4	Cable 23 / .0076"	As Required
5	Cable 40 / .0076"	As Required
6	Switch Single Way	As Required
7	Switch Two Way	As Required
8	Push Button	As Required
9	Bulb Holder Piano Type	As Required
10	Bulb Holder Button Type	As Required
11	Ceiling Rose	As Required
12	Fan Dimmer	As Required
13	Socket Two Pin	As Required
14	Socket Three Pin	As Required
15	Light Plug	As Required
16	Power Plug	As Required
17	PVC Pipe	As Required
18	PVC Elbow	As Required
19	PVC Band	As Required
20	Junction Box	As Required
21	Fan Box	As Required
22	Ravel Plug	As Required
23	Pipe Saddle	As Required
24	Cable Saddle	As Required
25	Board 4 x 4	As Required
26	Board 7 x 4	As Required
27	Board 8 x 10	As Required
28	TV Pin	As Required
29	Telephone Pin	As Required
30	Insulation Tape	As Required
31	PVC Duct Plain 3/4"	As Required
32	PVC Duct Slotted 1"	As Required
33	PVC Duct Plain 3/4"	As Required
34	PVC Duct Slotted 1"	As Required
35	Fuse Piano Type	As Required
36	Main Switch	As Required
37	Breaker Single Pole	As Required
38	Breaker Double Pole	As Required
39	Volt meter Panel	As Required
40	Ampere Meter Panel	As Required
41	DB Box	As Required
42	DB Switch	As Required
43	PG Connector	As Required
44	Neutral Terminal	As Required
45	Screw Different Size	As Required
46	Steel Nail Different Size	As Required
47	Bulb 100 Watt	As Required
48	Bulb 200 Watt	As Required

49	Nut Bolt Different Size	As Required
50	Electric Bell	As Required
51	Two Pin Shoe	As Required
52	Three Pin Shoe	As Required
53	Cable Tube Connection	As Required
54	Tube Rod	As Required
55	Choke 20w, 40w	As Required
56	Tube Starter	As Required
57	Choke Patti Fitting	As Required
58	Winding Wire Different Size	As Required
59	Slat Paper Different Size	As Required
60	Cotton Tape	As Required
61	Sleeve Different Size	As Required
62	Varnish	As Required
63	Cable Three Core 40/ .0076	As Required
64	Cable Four Core 7/ .036	As Required
65	Cable Three Core 7/ .029	As Required
66	Connection Plate	As Required
67	Clutch Plate	As Required
68	Breaker Fitting Patti (Din Ray)	As Required
69	Relay 12V, 5A	As Required
70	Resistor Different Types	As Required
71	Transistor Different Types	As Required
72	LED	As Required
73	Diode	As Required
74	Rectifier Bridge	As Required
75	Carbon Brush	As Required
76	Battery 6v	As Required
77	Breaker Stripe	As Required
78	Flout Switch	As Required
79	Magnetic Connector	As Required
80	Cut Out	As Required
81	Breaker Cartridge Fuse	As Required
82	ON / OFF Push Button	As Required
83	Timer	As Required
84	Relay AC – 220V	As Required
85	Relay DC- 12V	As Required
86	Selector Switch Volt Meter	As Required
87	Selector Switch Ampere Meter	As Required
88	Emergency Switch	As Required
89	Soldering Wire	As Required
90	Paste	As Required
91	Light Indicator	As Required
92	Limit Switch (MEM Inter Locking)	As Required
93	Motor Driven Selector Switch (Water Tank)	As Required
94	Speaker	As Required
95	Acid	As Required
96	Hydro Metter	As Required
97	Multi Metter (Analogue / Digital)	As Required
98	Cam Starter (single phase & three phase)	As Required
99	Generator Switch	As Required
100	Star Delta Manual	As Required
101	Capacitor Different Size	As Required
102	Intercom Bell	As Required
103	Over Load Relay	As Required
104	Forward Reverse Switch	As Required
105	Tai Different Size	As Required
106	Magnetic Connector	As Required
107	Current Transformer	As Required
108	8 Pin type & 11 Pin type relay with base	As Required
109	Timer Circuit	As Required
110	Relay Circuit	As Required



111	Bobbin Transformer	As Required
112	Core Transformer	As Required
113	Coal	As Required
114	Calcium Carbonate	As Required
115	Petrol	As Required
116	Heat Sleeve Tube	As Required
117	Changer Over Switch	As Required
118	Timer 0-60 second	As Required
119	Time 1-6 minute	As Required
120	Baboon 1 ¼", 1 ½", 2", 2x3"	As Required
121	UPS Card	As Required



# 1

## ASSESSMENT SUMMARY & RECORD

CANDIDATE NAME:

FATHER NAME:

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	OBSERVATION	PORTFOLIOS		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF COMPETENCY STANDARD: PERFORM DISTRIBUTION OF ELECTRICAL SUPPLY		
Practical skill demonstration			✓		<ul style="list-style-type: none"> <li>Review electrical load schedule at distribution box</li> <li>Set distribution priority at distribution box</li> <li>Monitor electrical load at distribution box</li> </ul>		
Knowledge Assessment		✓			<ul style="list-style-type: none"> <li>Answer any questions your assessor may have for you during the practical skill demonstration</li> </ul>		
Other Requirements	✓	✓	✓	✓	<ul style="list-style-type: none"> <li>All candidate module reports completed by Instructor including:                             <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>All work completed as module assignments including:                             <ul style="list-style-type: none"> <li>✓ Work related documents and procedures</li> </ul> </li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name:

Father Name:

ALL WORK ASSESSED IN THIS COMPETENCY STANDARD MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following practical tasks within set timeframe of four hours :

- Review electrical load schedule at distribution box
- Set distribution priority at distribution box
- Monitor electrical load at distribution box

ACTIVITIES	CANDIDATE RESPONSE
<p>1. Complete practical assessment of performing distribution of electrical supply under observation by an assessor</p>	<ul style="list-style-type: none"> <li>• During a practical assessment, under observation by an assessor, I will correctly:               <ul style="list-style-type: none"> <li>• Review electrical load schedule at distribution box                   <ul style="list-style-type: none"> <li>✓ Check layout plan</li> <li>✓ Check load inflow and demand</li> <li>✓ Check input and output voltages and voltage drop</li> </ul> </li> <li>• Set distribution priority at distribution box                   <ul style="list-style-type: none"> <li>✓ Review distribution priority plan</li> <li>✓ Reschedule electrical load as per distribution priority</li> </ul> </li> <li>• Monitor electrical load at distribution box                   <ul style="list-style-type: none"> <li>✓ Monitor electrical load</li> <li>✓ Monitor power consumption</li> <li>✓ Monitor voltage drops</li> <li>✓ Perform logout/tag out</li> </ul> </li> </ul> </li> </ul>
<p>2. Complete knowledge assessment</p>	<p>Answer all questions my assessor may have during the practical assessment</p>
<p>3. Other requirements</p>	<ul style="list-style-type: none"> <li>• All candidate module reports completed by Instructor including:               <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> </ul> </li> <li>• All work completed as module assignments including:               <ul style="list-style-type: none"> <li>✓ Material estimates</li> <li>✓ Documented wiring test results</li> <li>✓ Work related documents and procedures</li> </ul> </li> </ul>

# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name:

Father Name:

### INSTRUCTIONS FOR ASSESSOR

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

The supplied electrical system requiring distribution of electrical supply must meet the evidence requirements of the candidate's competence in performing distribution of electrical supply

Set timeframe for practical skill demonstration must reflect the commercially viable timeframe for the tasks.

Oral questioning may be used to clarify candidate understanding of the topic and its application

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES	NO	ASSESSOR COMMENTS
1. Completed practical assessment under observation by an assessor	During a practical assessment, under observation by an assessor, the candidate correctly :			
	• Review electrical load schedule at distribution box			
	✓ Check layout plan			
	✓ Check load inflow and demand			
	✓ Check input and output voltages and voltage drop			
	• Set distribution priority at distribution box			
	✓ Review distribution priority plan			
	✓ Reschedule electrical load as per distribution priority			
	• Monitor electrical load at distribution box			
	✓ Monitor electrical load			
	✓ Monitor power consumption			
2. Knowledge assessment	Candidate's answers to questions are correct and demonstrate understanding of the topics and their application.			
	<i>Assessor to document below all questions asked and candidate answers. Use extra sheets if required and attached.</i>			
3. Other requirements	<ul style="list-style-type: none"> <li>• Candidate provided all module reports completed by Instructor including;                             <ul style="list-style-type: none"> <li>○ Observations</li> <li>○ Demonstrations</li> <li>○ Questions and recorded answers</li> </ul> </li> <li>• All work completed as module assignments including;                             <ul style="list-style-type: none"> <li>○ Work related documents and procedures</li> </ul> </li> </ul>			

# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

<b>Instructions</b>	<p>This section contains information regarding;</p> <ul style="list-style-type: none"> <li>Context of the assessment</li> <li>List of required tools and equipment.</li> <li>List of consumable items required during the service</li> </ul>
1. Context of Assessment	<p>This practical skill demonstration will be conducted in a Building Electrician's lab/workshop environment</p> <p>The Assessor will select the required tools, equipment and consumables from the list below for the assessment</p>

2. List of tools and equipment required		
S. No	Tools and equipment	Quantity
1	Personal protective equipment	05 No's
2	Fire extinguishers	05 No's
3	First aid box	05 No's
5	Amp meter	05 No's
6	AVO meter	05 No's
13	Clamp on meter	05 No's
15	Cutter	05 No's
16	Drill machine	05 No's
17	Earth tester meter	05 No's
18	Extension board	05 No's
19	File set	05 No's
20	First Aid box	05 No's
21	Gloves	05 No's
22	Goggles	05 No's
23	Grinder	05 No's
24	Hammer	05 No's
25	Hand drill machine	05 No's
26	Helmet	05 No's
27	Herts meter	05 No's
28	Hex saw	05 No's
29	Knife (cable)	05 No's
30	Level	05 No's
31	L-key set	05 No's
32	Lock plier	05 No's
33	Measuring tape	05 No's
34	Megger meter (Analog & Digital)	05 No's
35	Micrometre	05 No's
36	Multimeter	05 No's
37	Number punch	05 No's
38	Phase sequence meter	05 No's
43	Punching tool (Networking /Telephone)	05 No's
44	Racet set	05 No's
45	Safety boots	05 No's
46	Scissor	05 No's
47	Screw driver set	05 No's
48	Soldering iron	05 No's
49	Spanner set	05 No's
50	Steel scale	05 No's
51	Steel wire	05 No's
52	synchronizing meter	05 No's
53	Tachometer	05 No's
54	Tester	05 No's

55	Thimble press	05 No's
56	Tong tester (clamp-on meter) AC/DC	05 No's
57	Torch	05 No's
58	Vernier calliper	05 No's
59	Volt meter	05 No's
60	Wire gauge	05 No's
61	Wood saw	05 No's

3. List of consumable items required		
S. No	Consumable Items	Quantity
1	Cable 3 / .029"	As Required
2	Cable 7 / .029"	As Required
3	Cable 1 / .036"	As Required
4	Cable 23 / .0076"	As Required
5	Cable 40 / .0076"	As Required
6	Breaker 3P 40 Amp	As Required
7	Breaker 10,16,20 Amp	As Required





# 1

## ASSESSMENT SUMMARY AND RECORD

ACTIVITY	METHOD				DESIRED OUTCOMES	RESULT	
	WRITTEN	ORAL	PORTFOLIO	OBSERVATION		COMPETENT	NOT YET COMPETENT
NATURE OF ACTIVITY					DESIRED OUTCOMES FOR SUCCESSFUL ASSESSMENT OF: APPLY BUILDING ELECTRICIAN INSTALLATION SKILLS FOR SOLAR PV SYSTEMS		
Practical final project				✓	Complete supplied project brief related to application of Building Electrician installation skills for solar PV systems: <ul style="list-style-type: none"> <li>• Install three phase wiring to start a three phase motor(3-hp) by using star delta starter in workshop</li> <li>• Design and install 500 W off-grid solar PV System on roof/ground of workshop</li> </ul>		
Knowledge assessment	✓	✓			<ul style="list-style-type: none"> <li>• Answer all questions the Assessment Panel will have following oral presentation of completed project brief</li> </ul>		
Other requirements				✓	<ul style="list-style-type: none"> <li>• All completed course assignments, projects and formative assessments including:               <ul style="list-style-type: none"> <li>✓ Observations</li> <li>✓ Demonstrations</li> <li>✓ Questions and recorded answers</li> <li>✓ Oral presentation of project to assessment panel</li> <li>✓ Completed learner logbooks</li> <li>✓ Completed work forms/records</li> <li>✓ Completed job cards</li> <li>✓ Evidence of participating in training programs</li> <li>✓ Documented training outcomes such as reports and portfolio writing</li> <li>✓ Measuring instrument calibration records</li> </ul> </li> </ul>		

# 2

## CANDIDATE ASSESSMENT

Candidate Name..... Father Name .....

ALL WORK ASSESSED FOR THESE COMPETENCY STANDARDS MUST BE YOUR OWN WORK.

### GUIDANCE TO CANDIDATE

To meet this standard you are required to complete the following tasks within **five hours** timeframe:

- Install three phase wiring to start a three phase motor(3-hp) by using star delta starter in workshop
- Design and install 500 W off-grid solar PV System on roof/ground of workshop

ACTIVITIES	CANDIDATE RESPONSE
<p>1. Complete project brief of Install three phase wiring to start a three phase motor by using star delta starter in workshop under observation by Instructor</p> <p>2. Complete project brief of Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop under observation by Instructor</p>	<p>During a practical assessment, under observation by an assessor, I will correctly carry out:</p> <ul style="list-style-type: none"> <li>• <b>Install three phase wiring to start a three phase motor by using star delta starter in workshop</b> <ul style="list-style-type: none"> <li>✓ Draw wiring layout and measurements of three phase wiring.</li> <li>✓ Estimate materials including specifications, rating of three phase wiring components.</li> <li>✓ Select tools, equipment and materials for three phase wiring.</li> <li>✓ Install conduit, GI pipes, PVC pipes and/or ducts of three phase wiring.</li> <li>✓ Connect power cables, control cables (star delta starter) and fixtures of three phase wiring.</li> <li>✓ Inspect power and control wiring of three phase wiring.</li> <li>✓ Carry out testing of three phase wiring components and record results of three phase wiring.</li> <li>✓ Balance the load according to distribution priorities and load management at distribution box.</li> <li>✓ Commission of three phase wiring.</li> <li>✓ Carry out final quality inspection of three phase wiring.</li> <li>✓ Clean up and store tools, equipment and material of three phase wiring.</li> </ul> </li> <li>• <b>Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop</b> <ul style="list-style-type: none"> <li>✓ Conduct site visit to prepare plan for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Estimate materials including specifications and rating of components.</li> <li>✓ Select tools, equipment and materials.</li> <li>✓ Choose appropriate array frame for the roof type and determine and set correct tilt angle and adjustments for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Mark points for fixing of PV frame to install of 500 watt off-grid solar PV System.</li> <li>✓ Mount a photovoltaic array.</li> <li>✓ Install solar photovoltaic array and components in suitable location for installation of 500 watt off-grid solar PV System.</li> <li>✓ Connect PV panels and electrical components and minimize cable route length to minimize power loss.</li> <li>✓ Interpret and confirm installation as per drawing.</li> <li>✓ Arrange for earthing less than 5 ohm for 500 watt.</li> <li>✓ Carry out Electrical operational checks for 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Perform electrical Test (Voc, Ise,IL,VL) and adjust component/or parts of 500 watt off-grid solar PV System.</li> <li>✓ Perform final quality inspection of 500 watt off-grid solar PV System.</li> <li>✓ Install the load of 500 watt i.e. search light to determine the power required generation.</li> <li>✓ Commission the 500 watt off-grid solar PV System.</li> <li>✓ Clean up and store tools, equipment and materials of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul> </li> </ul>

<p><b>3. Present completed project brief supplied by Instructor</b></p>	<ul style="list-style-type: none"> <li>• Oral presentation of project brief and completed project work to Assessment Panel.</li> <li>• Presentation to include: <ul style="list-style-type: none"> <li>✓ Requirements of brief</li> <li>✓ Planning and preparation of project</li> <li>✓ Problems encountered and how they were dealt with</li> <li>✓ Project outcome/s</li> <li>✓ Lessons learnt from undertaking project (reflective thinking)</li> </ul> </li> <li>• Presentation to take no longer than 10 minutes</li> </ul>
<p><b>4. Answer all questions Assessor Panel will have following project presentation</b></p>	<p>My answers to questions are correct and demonstrate my understanding of the topics and their application.</p>

# 3

## ASSESSOR JUDGEMENT GUIDE

Candidate Name ..... Father Name .....

### INSTRUCTIONS FOR ASSESSMENT PANEL

THIS SECTION CONTAINS MINIMUM EVIDENCE REQUIREMENTS.

- This section contains minimum evidence requirement. Oral questioning may be used to clarify candidate understanding of the topic and its application.

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO	ASSESSOR COMMENTS ON CANDIDATE PERFORMANCE
1. Completes Practical task of all course assignments	<ul style="list-style-type: none"> <li>During a practical assessment under observation by an assessor the candidate correctly carried out the following task</li> </ul>		
<ul style="list-style-type: none"> <li>Install three phase wiring to start a three phase motor by using star delta starter in workshop</li> </ul>	<ul style="list-style-type: none"> <li><b>Install three phase wiring to start a three phase motor by using star delta starter in workshop</b></li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Draw wiring layout and measurements of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Estimate materials including specifications, rating of three phase wiring components.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Select tools, equipment and materials for three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Install conduit, GI pipes, PVC pipes and/or ducts of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Connect power cables, control cables (star delta starter) and fixtures of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Inspect power and control wiring of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Carry out testing of three phase wiring components and record results of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Balance the load according to distribution priorities and load management at distribution box.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Commission of three phase wiring.</li> </ul>		
<b>Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop</b>	<ul style="list-style-type: none"> <li>✓ Carry out final quality inspection of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Clean up and store tools, equipment and material of three phase wiring.</li> </ul>		
	<ul style="list-style-type: none"> <li><b>Design and installation of 500 watt off-grid solar PV System on roof/ground of workshop</b></li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Conduct site visit to prepare plan for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Estimate materials including specifications and rating of components.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Select tools, equipment and materials.</li> </ul>		
	<ul style="list-style-type: none"> <li>✓ Choose appropriate array frame for the roof type and determine and set correct tilt angle and adjustments for design and installation of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>		

ACTIVITIES	MINIMUM EVIDENCE REQUIRED	YES/NO		ASSESSOR COMMENTS ON CANDIDATE PERFORMANCE
	<ul style="list-style-type: none"> <li>✓ Mark points for fixing of PV frame to install of 500 watt off-grid solar PV System.</li> <li>✓ Mount a photovoltaic array.</li> <li>✓ Install solar photovoltaic array and components in suitable location for installation of 500 watt off-grid solar PV System.</li> <li>✓ Connect PV panels and electrical components and minimize cable route length to minimize power loss.</li> <li>✓ Interpret and confirm installation as per drawing.</li> </ul>			
	<ul style="list-style-type: none"> <li>✓ Arrange for earthing less than 5 ohm for 500 watt.</li> <li>✓ Carry out Electrical operational checks for 500 watt off-grid solar PV System on roof/ground of workshop.</li> <li>✓ Perform electrical Test (Voc,Isc,IL,VL) and adjust component/or parts of 500 watt off-grid solar PV System.</li> <li>✓ Perform final quality inspection of 500 watt off-grid solar PV System.</li> <li>✓ Install the load of 500 watt i.e. search light to determine the power required generation.</li> <li>✓ Commission the 500 watt off-grid solar PV System.</li> <li>✓ Clean up and store tools, equipment and materials of 500 watt off-grid solar PV System on roof/ground of workshop.</li> </ul>			
<b>3. Present completed project brief to Assessment Panel</b>	<p>Oral presentation of project brief and completed project work to Assessment Panel.</p> <p>Presentation to include:</p> <ul style="list-style-type: none"> <li>• Requirements of brief</li> <li>• Planning and preparation of project</li> <li>• Problems encountered and how they were dealt with</li> <li>• Project outcome/s</li> <li>• Lesson learnt (reflective thinking)</li> </ul> <p>Presentation to take no longer than 10 minutes</p>			
<b>4. Answer all questions Assessment Panel will have following project presentation</b>	<p>Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application.</p> <p>Assessment Panel to document all questions asked, if any, and the answers here. Use extra pages as required and attach here.</p>			

# 4

## LIST OF TOOLS, EQUIPMENT, MATERIAL AND CONTEXT OF ASSESSMENT

### Instructions

This section contains information regarding;

- Context of the assessment
- List of required tools and equipment's.
- List of consumable items required during the service

#### 1. Context of Assessment

This practical final project will be conducted in a Building Electrician's lab/workshop environment  
Required tools, equipment and consumables will vary according to project brief.

#### 2. List of tools and equipment required

S. No	Name of Items ( tools and equipment's)	Quantity (No's)
1	Safety Hamlet	5
2	Insulated Pliers With Side Cutter	5
3	Insulated Long Nose Pliers With Side Cutter	5
4	Insulated wire Cutter	5
5	wire stripers	5
6	insulated screw drivers	5
7	High Insulated Rubber Hand Gloves	5
8	Insulated Work Bench	5
9	Power Supply	5
10	Main Switch	5
11	Tag Off / Log Off Nos	5
12	Drawing Board	5
13	Papers for Drawing	5
14	Led Pencil	5
15	Measuring Steel Tape	5
16	Steel Rule	5
17	PVC Pipes Different Size	5
18	Insulated Plier With Side Cutter	5
19	Insulated Long Nose Plier With Side Cutter	5
20	Insulated wire Cutter	5
21	Blow Lamp	5
22	Hacksaw	5
23	Measuring Steel Tap	5
24	Steel Wire	5
25	Milled Steel Wire	5
26	Calculator	5
27	Measuring Steel Tape	5
27	Steel Rule	5
28	Drawing Board	5
29	Switch Board	5
30	Distribution Board	5
31	Steel Rule	5
32	Insulated Plier With Side Cutter	5
33	Insulated Long Nose Plier With Side Cutter	5
34	Insulated wire Cutter	5
35	Flat Screw Driver	5
36	Level tool	5

37	Hammer of 2 Kg	5
38	Tong Tester Metter	5
39	Calculator	5
40	Micrometre 0 To 1	5
41	Insulated Plier With Side Cutter	5
42	Insulated Long Nose Plier With Side Cutter	5
43	Insulated wire Cutter	5
44	Screw Driver Different Size	5
45	Micrometre 0 To 1	5
46	Calculator	5
47	Different Electrical Item	5
48	Watt meter	5
49	Micrometre/SWG Gauge	5
50	Chisel 8'	5
51	Hammer 2kg	5
52	Insulated Plier With Side Cutter	5
53	Insulated Long Nose Plier With Side Cutter	5
54	Insulated wire Cutter	5
55	Screw driver Different Size	5
56	Earth Electrode	5
57	Boring Machine	1
58	8 SWG Size Wire	5
59	Bus Bar	5
60	Screw Wrench	5
61	Spanner Set	5
62	Earth Tester Meter	5
63	Hertz Meter	5
64	Thimble Press	5
65	Charge Controller	5
66	Battery Charger	5
67	Tong Tester (Clamp-On Meter) AC/DC	5
68	Compass	5
69	Megar meter (Analogue & Digital)	2
70	PV panel 500 watts with Mount stand	5
71	Battery 100 AH	5
72	Magnetic contactor	25
73	Cam Switch (STAR-DELTA)	5
74	Overload relay	5

### 3. List of consumable items required

S. No	Consumable Items	Quantity
1	safety shoes	5
2	Safety Eyes Glass	5
3	safety gloves	5
4	Dungaree	5
5	Phase tester	5
6	Insulated Rubber Mat	5
7	Samad Bond	1 pack
8	Tag Off / Log Off Nos	5
9	Map OHS Precautions	1

10	Documents Related Drawing	as per requirements
11	Papers for Drawing	15
12	Led Pencil	15
13	Rubber	15
14	Permanent Marker	10
15	Tag Off / Log Off Nos	15
16	Solution Pak	1 pack
17	joints boxes	15
18	PVC Pipes Different Size	5 length
19	fan boxes	15
20	junctions boxes	15
21	Ball Point	10
22	job related documents	as per requirements
23	Papers for Drawing	15
24	Led Pencil	15
25	Rubber	15
26	switch board	15
27	Distribution Board as per Required	15
28	Drawing Map	1
29	Power Plug (Male, Female)	15
30	Plastic Board	15
31	Light Plug and Box	15
32	Main Supply Cable	2 coil
33	Phase tester	5
34	TV and Telephone Box	15
35	Paper for Documentation	15
36	Light Plug	15
37	Switch Board	15
38	TV Plug with Board	15
39	Marker	15
40	Chisel	15
41	PVC pipes	5 length
42	Switch Board with Box	15
43	PVC elbow	15
44	PVC Socket	15
45	PVC clamp	15
46	Volt Metter	15
47	Paper	15
48	Ballpoint	15
49	Cable According to Specification	As per requirement
50	Cable Size Table	5
51	Insulation Tester	5
52	Distribution Board as per Required	5
53	Cable Specification Table	5
54	Nut Bolt	3 dozen different sizes
55	earth wire	as per requirements
56	Copper Bus Bar	5
57	Conduit Pipe/ PVC Pipe	5 length
58	Nut Bolt	3 dozen



