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ELECTRICAL ENGINEERING (POWER OPTION) LEVEL 6

ENG/OS/PO/CR/07/6

Install Solar Systems

July/August 2025



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

PRACTICAL ASSESSMENT

Time: 4 HOURS

INSTRUCTIONS TO CANDIDATE:

Practical 1

1. The following loads are for a domestic home. They are to be installed and powered by a solar PV system. The table shows the household's DC energy requirements.

Appliance	Number	Power Consumption(W)	Time of usage (hrs.)
DC Lamps	4	5	4
Laptops	2	12 W	12
Tablets	2	10	6
Small radio	1	8	12

Note:

The small radio, tablet, and laptop are plugged into a DC socket, and the DC lamp is connected to one-way lighting. Assume the system will operate at,

- i. 50% of battery DOD
- ii. 80% battery efficiency
- iii. 80% module efficiency
- iv. 4 sun-peak hours a day

You are required to perform the following tasks

TASK 1: Draw the wiring diagram of the solar system powering the loads.

TASK 2: Calculate the following system components as demanded by the above situation:

- i. Daily power demand
- ii. Module/array
- iii. Battery
- iv. Charge controller

Practical 2

Figure 1 shows the layout diagram of a grid-tie solar PV system. You are required to perform the following tasks;

Task 3: Draw the wiring diagrams such that;

- a) Switch S1 controls L1 and Switch S2 controls L2;
- b) Socket outlets S/o1 and S/o2 are connected in a ring and socket s/o3 is a spur;
- c) Solar PV components are wired in correct sequence.

Task 4: Install the circuit using mini-trunking wiring system, and test its operation.

2. You have been provided with the following resources for the practical tasks:

- i. Installation board
- ii. 40W Solar panel
- iii. Energy meter
- iv. 32A DC disconnect switch

- v. 32 AC disconnect switch
- vi. Change over switch
- vii. Inverter
- viii. 4 way Consumer control unit
- ix. Deep pattress
- x. Shallow pattress
- xi. End box
- xii. 1.5 mm² single core cable
- xiii. 2.5 mm² single core cable
- xiv. 4.0 mm² single core cable
- xv. Wood screws
- xvi. Lamp holders
- xvii. Bulbs
- xviii. Socket outlets
- xix. Switches
- xx. Switches
- xxi. Mini trunking
- xxii. Battery

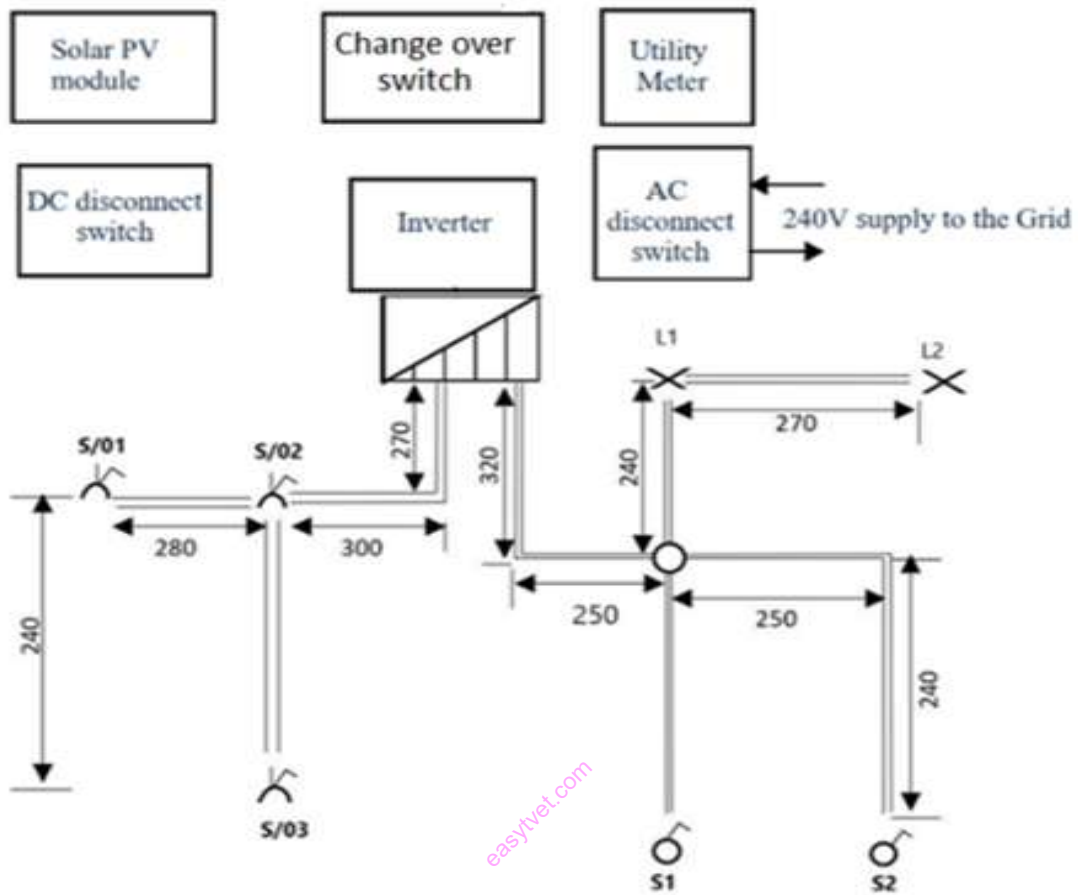


FIGURE 1