# Question 17

An off-grid PV installation is to be used to provide a single phase 230V electricity supply to a rural shed and office on the outskirts of a town. The customer has asked you to investigate and come up with a design, install option and commission package to meet the projected electrical load. The PV panel array is going to be mounted on the shed roof.

a) State who you could consult with in developing the design.

b) State who, depending on the area, energy output and PV panel mounting arrangement on the roof, is required to test/check and sign off the PV installation.

c) You use a portable generator for three days to determine the energy consumed and the peak load current that occurred during that time.

Determine the battery size to provide storage if there is little input over three days from the PV panel.

Given that the recorded readings are 0.665 kwh per day and a peak current of 15A. The 24V battery pack discharge factor is 0.85 and self-loss factor is 0.65. Show your working below.

d) You have chosen to use a readily available PV panel, 250W peak output at the peak power point and the panel size is 1560 mm$^2$. The data from a website indicates for the location that the lowest expected solar radiation figure for the year should not be less than 0.99kWh/m$^2$. The panel redundancy factor for the design PV array can be taken as 1.3

Determine the number of panels required to provide sufficient energy per day to have neutral energy loss.

e) Determine the size of the inverter, so it can handle the maximum current as measured by you during the test with the generator and add a capacity percentage for the future and reduce the stress on the inverter. Use a capacity factor of 130%. Show your working below.