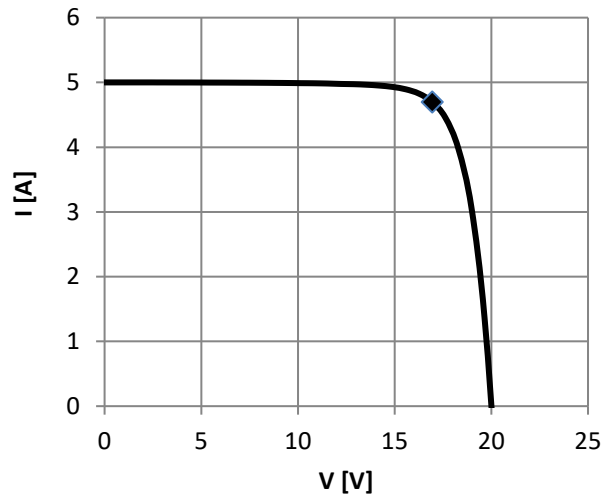


PHOTOVOLTAICS 2015/2016

You have 90 minutes to solve this test. You may answer in English or Portuguese.

Assume reasonable data for any relevant parameters that are not presented.

1. Discuss, quantitatively, the required efficiency of a new PV technology which has a cost of 20€/m² but a lifetime of only 7 years.
2. The figure below presents the IV curve (in STC conditions) of a solar module with 0.6m² with 30 crystalline silicon solar cells.



- a) Determine I_{sc} , V_{oc} , V_{max} , I_{max} , P_{max} , efficiency and fill factor of this module.
- b) Considering $NOCT = 45^{\circ}C$, determine I_{sc} , V_{oc} , V_{max} , I_{max} , P_{max} , efficiency and fill factor for $1100W/m^2$ and an ambient temperature of $42^{\circ}C$?

A solar array including 5 strings, each with 10 of these modules, is to be installed in a remote equatorial location where ambient temperature ranges from 15 to 47°C.

- c) Determine the required current range of the inverter
- d) Determine the required voltage range of the inverter
- e) Discuss the recommended nominal power of the inverter
- f) Discuss the specific technical concerns of deployment of PV systems in remote equatorial locations.