

Series N ° : 01

Exercise 1: Solar Panel Energy Output

Problem: A solar panel with an area of 50 m^2 is installed at a location with an average solar intensity of 900 W/m^2 . The panel's efficiency is 18%. How much electrical energy (in kilojoules) will the panel produce in 8 hours?

Exercise 2: Solar Water Heating

Problem: A solar water heating system with a collector area of 30 m^2 receives an average solar intensity of 750 W/m^2 . The efficiency of the system is 60%. How much energy (in kWh) can the system produce in 10 hours?

Exercise 3: Solar Panel Efficiency

Problem: A solar panel with an area of 25 m^2 receives an average solar radiation of 1000 W/m^2 . If the efficiency of the panel is 20%, how much power (in watts) does the panel produce at peak sunlight?

Exercise 4: Solar Panel Energy Generation in a Day

Problem: A 150 m^2 solar panel array is installed in an area with an average solar radiation of 800 W/m^2 . The efficiency of the panels is 15%. How much energy (in kWh) will the array generate in 12 hours?

Exercise 5: Solar Energy for Home Appliances

Problem: A house uses 5 kWh of electricity every day. If solar panels are installed with an area of 40 m^2 and the solar radiation is 1000 W/m^2 , with an efficiency of 18%, how many hours of sunlight will the panels need to generate enough energy to meet the daily consumption?

Exercise 6: Solar Energy Conversion Efficiency Comparison

Problem:

Two solar panels are being compared:

- **Panel A** has an area of 4 m^2 and an efficiency of 15%.
- **Panel B** has an area of 6 m^2 and an efficiency of 20%.

Both panels are exposed to sunlight with an intensity of 900 W/m^2 . Calculate and compare the electrical power output of both panels.

