

- (d) A silicon solar cell has an area of 4 cm^2 and is illuminated normally with AM1.5 solar radiation (1 kW m^{-2}). The short circuit current $I_{SC} = 160 \text{ mA}$ and the saturation current $I_S = 4 \times 10^{-9} \text{ mA}$.

Calculate the open circuit voltage V_{OC} .

The maximum power from this cell occurs when the voltage across the load is 0.55 V .

Calculate the maximum power and the maximum efficiency of this cell.

[You may assume the formula $I_C = I_L - I_S \{ \exp(V/V_T) - 1 \}$ where $V_T = 0.026 \text{ V}$.]

- (i) An α -particle and a neutron are produced by the fusion of deuterium and tritium in a thermonuclear reactor. Show how the available energy is shared between them. Estimate the kinetic energies of the α -particles and neutrons if the Q-value for the reaction is 17.6 MeV . State any assumptions you make.