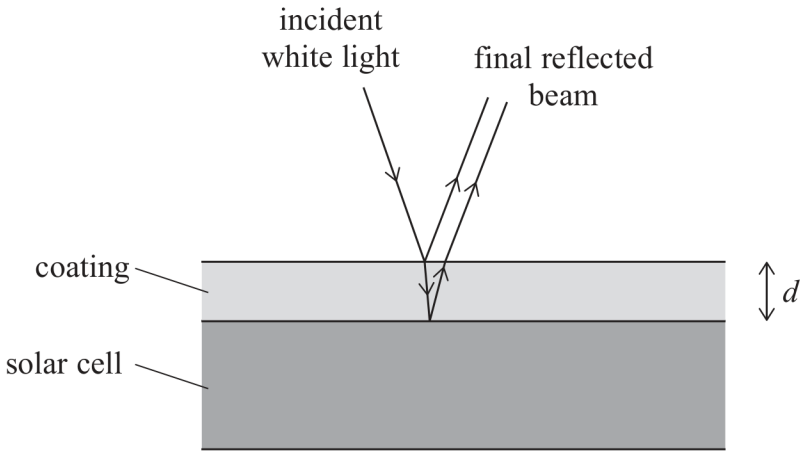
16 A solar cell has a thin coating of thickness d to reduce the reflection of light. White light incident on the coating is reflected from the top and bottom surfaces of the coating. This produces a final reflected beam, as shown.



(a) Explain why some wavelengths of the incident white light will be missing from the final reflected beam.

(3)

(b) White light is incident perpendicular to the surface of the coating.

Calculate the wavelength that would be missing from the final reflected beam.
Assume the refractive index is 2.3 for all visible wavelengths.

$d = 6.5 \times 10^{-8}$ m

(4)

Wavelength = ...

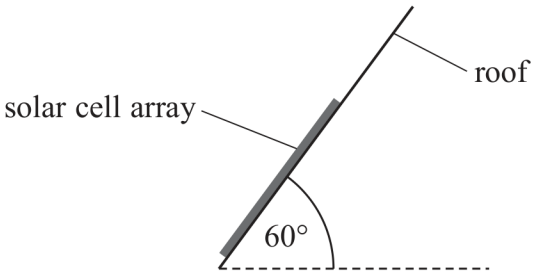
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) A solar cell array is placed on the roof of a house as shown.

The area of the solar cell array is $8.7\,m^2$. The roof of the house slopes at an angle of 60° to the horizontal as shown below.



When the intensity of radiation from the Sun perpendicular to the surface of the Earth is $1.1\,kW\,m^{-2}$, the output of the solar cell array is $5.4 \times 10^6\,J$ per hour.

Calculate the efficiency of the solar cell array.

(4)

Efficiency = ...

(Total for Question 16 = 11 marks)