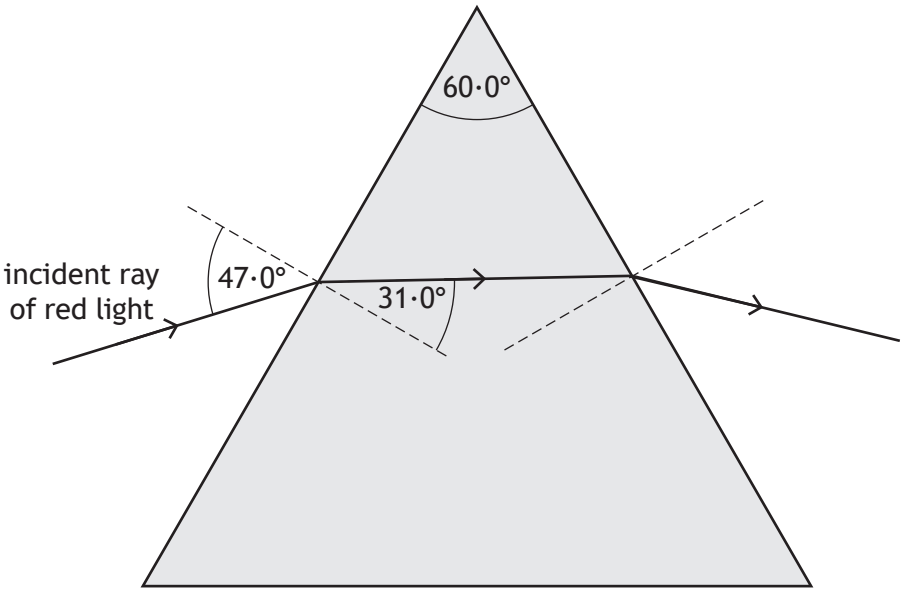
12. A technician fills a hollow prism with a sugar solution.

The technician shines red light from a laser into the prism.

The angle through which the light refracts depends upon the concentration of the sugar solution.



hollow prism
filled with solution

(a) (i) Calculate the refractive index of this solution. **3**

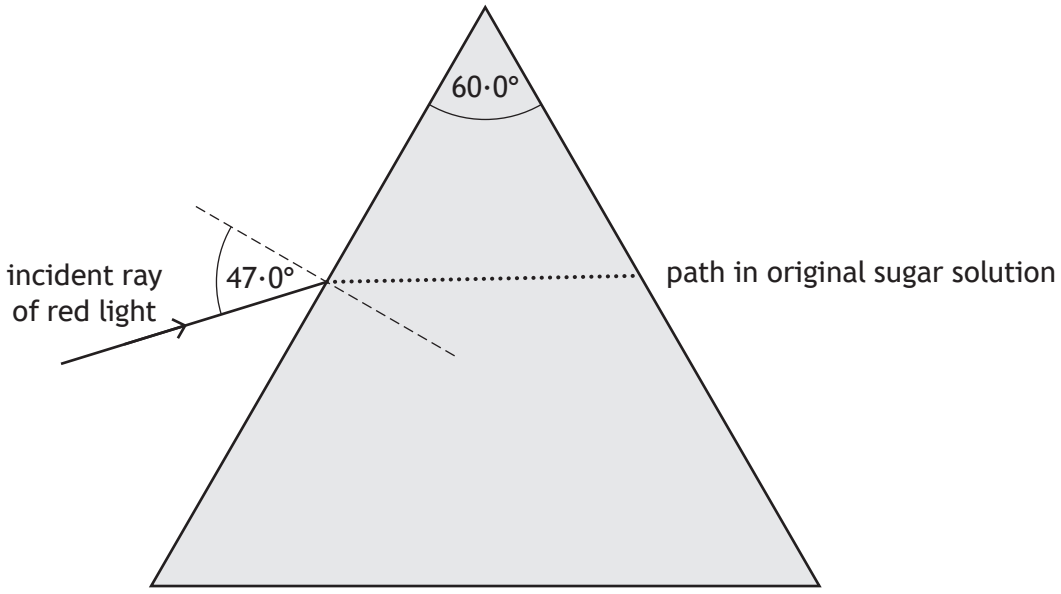
Space for working and answer

(ii) State how the frequency of the light in the solution compares to the frequency of the light in air. **1**

12. (continued)

(b) The prism is now filled with a more concentrated sugar solution, which has a greater refractive index.

On the diagram below, draw the path the ray will now follow **inside** the prism. **1**



hollow prism filled with more concentrated solution

(An additional diagram, if required can be found on *page 45*.)

(c) The experiment is repeated using green light from a laser and the more concentrated sugar solution. The light enters the prism at the same angle as before.

Explain the difference in the path taken by the green light compared to the path taken by the red light. **2**

[Turn over