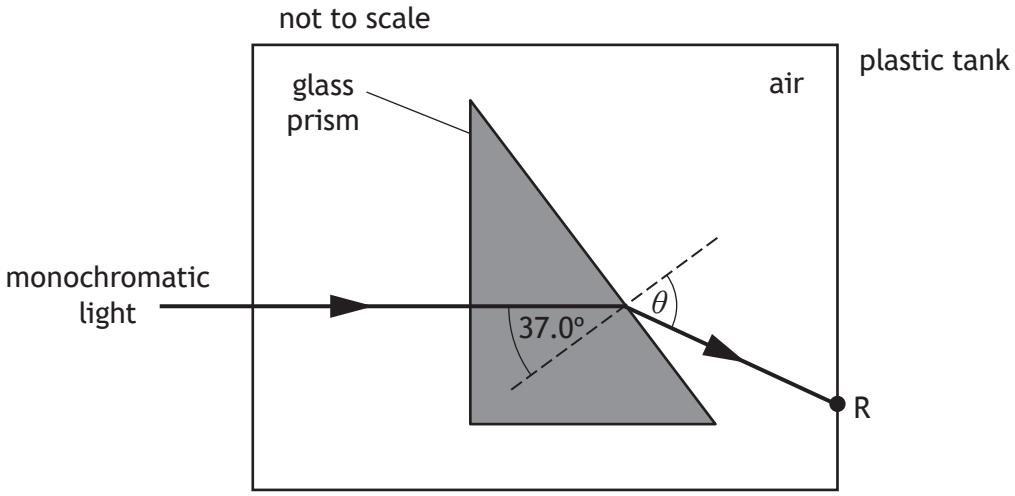
11. A triangular prism of borosilicate glass is placed inside a tank that has clear plastic walls.

(a) A ray of monochromatic light passes through the glass prism and exits the plastic tank at point R, as shown.



The refractive index of the glass for this light is 1.47.

Calculate angle θ. **3**

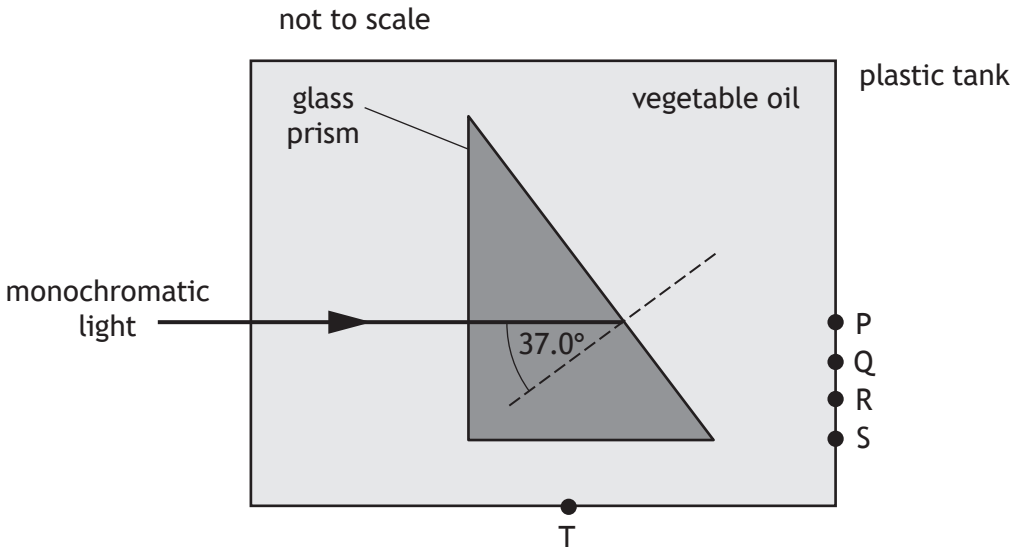
Space for working and answer

(b) Calculate the critical angle of the glass for this light. **3**

Space for working and answer

11. (continued)

(c) The plastic tank is now filled with vegetable oil. The refractive index of the vegetable oil for this light is 1.47.



State at which point, P, Q, R, S, or T, the ray of light will now leave the plastic tank.

Justify your answer. **2**

[Turn over