

SECTION B

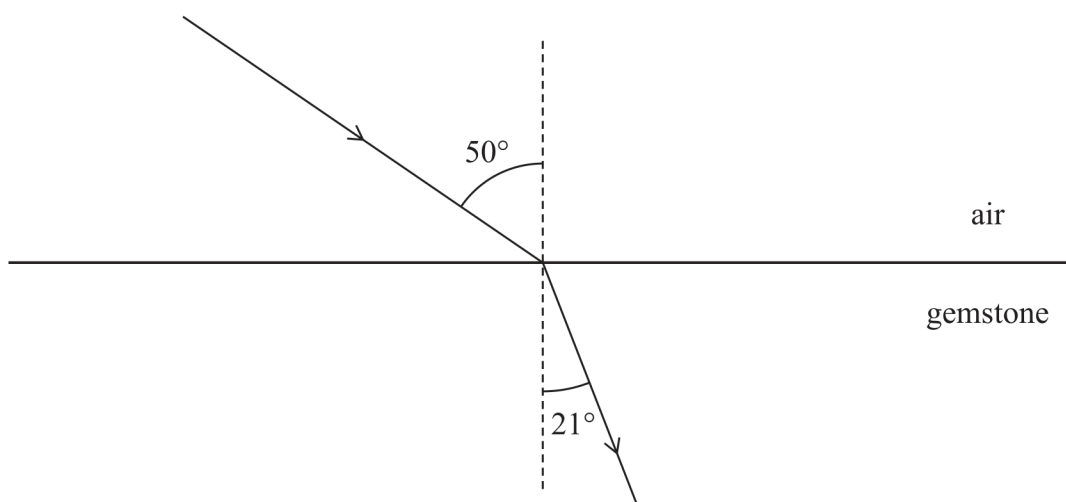
Answer ALL questions in the spaces provided.

- 11 Diamonds, cubic zirconia and silicon carbide can be used as gemstones in jewellery.

The speed of light in these materials is shown in the table.

	diamond	cubic zirconia	silicon carbide
speed of light / m s^{-1}	1.24×10^8	1.39×10^8	1.15×10^8

- (a) In order to identify the material used, a ray of light is directed towards a boundary between air and the gemstone.



Deduce the material used for the gemstone.

(3)

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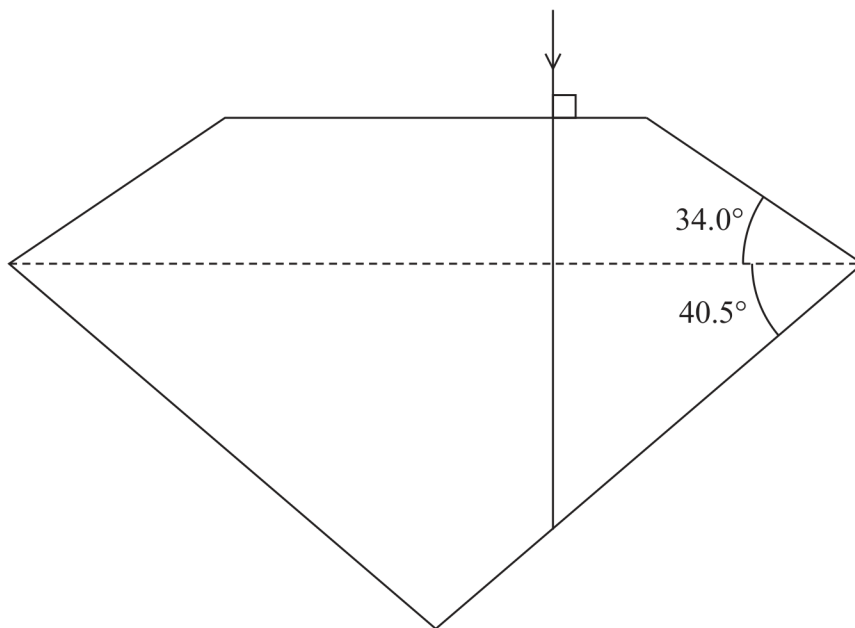
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- (b) Diamonds are cut into different shapes so that they ‘sparkle’ when light shines on them.

The diagram shows a ray of light entering a diamond and incident on a boundary between diamond and air.



- (i) Add to the diagram to show the path of the ray of light as it leaves this boundary. Your answer should include a calculation.

(4)

- (ii) Explain what would happen to the ray at this boundary if the material used was silicon carbide instead of diamond.

(2)