16 Light is a transverse wave.

(a) Describe the difference between transverse waves and longitudinal waves.

(2)

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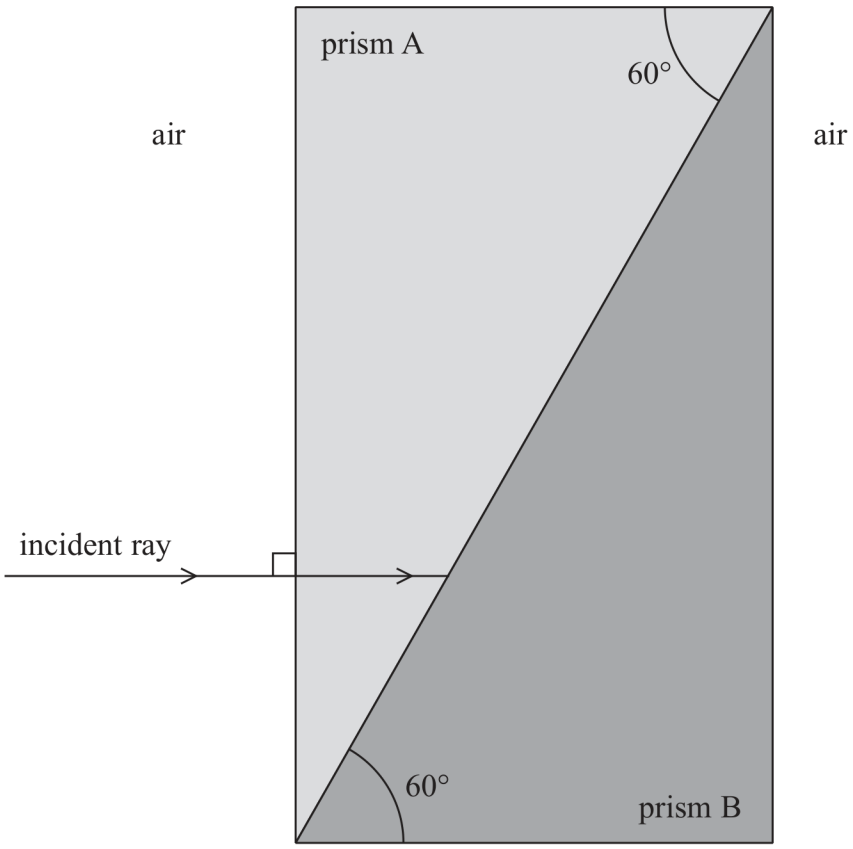
(b) Two prisms, A and B, made from different types of glass are placed in contact as shown. An incident ray of light enters prism A.



(i) State why the incident ray of light does not change direction as it enters prism A.

(1)

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(ii) The refractive index of the glass in prism B is greater than the refractive index of the glass in prism A. When the ray of light reaches the boundary between the prisms, some light is reflected and some is refracted.

Complete the diagram to show the two paths taken by the reflected and refracted light until they have returned to the air.

(4)

(iii) Calculate the angle of refraction as this ray of light travels across the boundary between prism A and prism B.

refractive index of glass in prism A = 1.40
refractive index of glass in prism B = 1.55

(3)

Angle of refraction = ...

(c) The light emerging from prism B is observed through a polarising filter. The polarising filter is rotated gradually, and the light transmitted by the filter varies in intensity.

Explain how this observation demonstrates that light waves are transverse.

(2)

(Total for Question 16 = 12 marks)