5 Fig. 5.1 shows a block ABCD made of glass that has a refractive index of 1.5. The block has one curved side AB and three straight sides, BC, CD and DA.

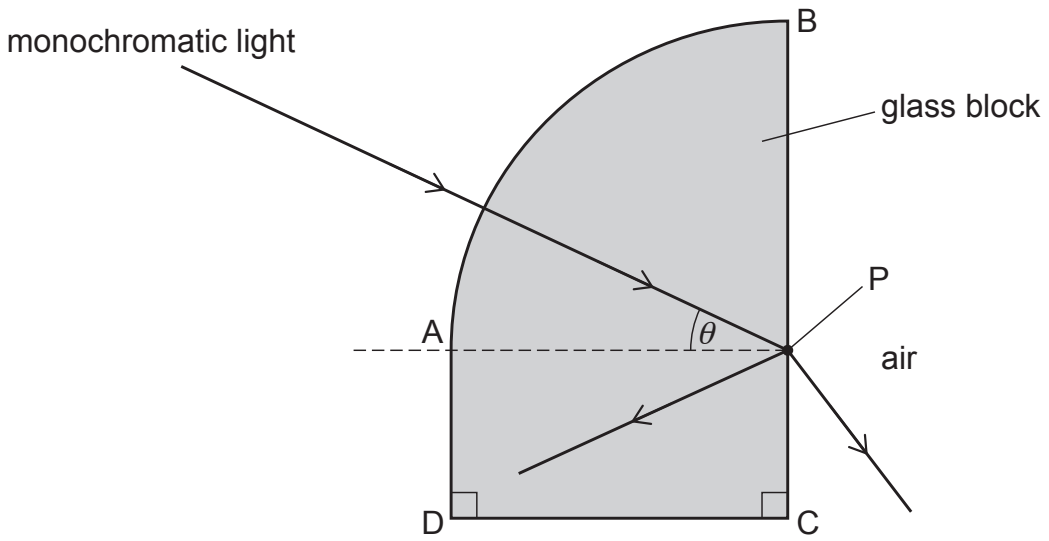

Fig. 5.1

There are right angles at C and D. The curved side AB is one quarter of the circumference of a circle that has its centre at point P.

A ray of monochromatic light enters the block through the curved side AB and strikes side BC at P. Some light emerges into the air and some is reflected.

(a) State what is meant by monochromatic.

.....

..... [1]

(b) Explain why the ray of light does **not** change direction when it enters the block through side AB.

.....

.....

..... [2]

(c) Show that the critical angle *c* for glass of refractive index 1.5 is 42°.

[2]

(d) Fig. 5.1 shows that the angle between the ray of light and line AP is θ, where line AP is at right angles to side BC.

Angle θ increases to 45°.

(i) State and explain what happens to the light that strikes P.

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.....

..... [2]

(ii) When $\theta = 45°$, the reflected light strikes side CD.

Describe what happens when this reflected light strikes side CD.

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..... [1]

[Total: 8]