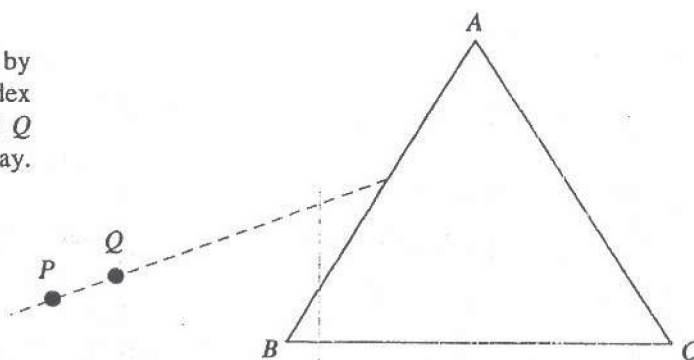


2001 A/L Structured Essay Question No (03)

3. The figure shows an arrangement used by a student to determine the refractive index of the material of a glass prism. P and Q are two pins used to trace the incident ray.



- (a) The student has not placed the pins properly. How would you place them properly?

(1)

(2)

- (b) (i) Describe how you would obtain the emergent ray experimentally.

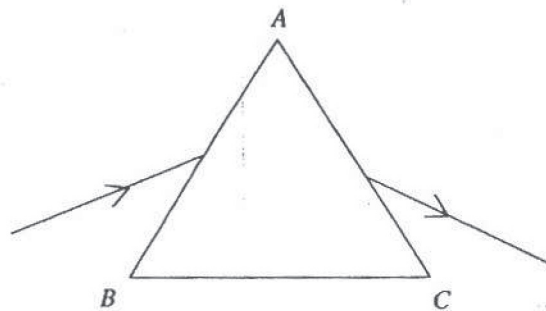
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- (ii) Why is it not possible to use one pin instead of two pins for the above (b) (i)?

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- (c) Mark the following angles on the diagram.

- (i) Angle of incidence, i_1
- (ii) Angle of refraction at the surface AB , r_1
- (iii) Angle of incidence on the surface AC , r_2
- (iv) Angle of emergence, i_2
- (v) Angle of deviation, d



- (d) Write down an expression for d in terms of i_1 , i_2 , r_1 and r_2 .

.....

(e) For a particular incident ray $i_1 = 10^\circ$ and $r_1 = 6^\circ$.

(i) What is the refractive index of glass?

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(ii) If the refracting angle of the prism is 60° , find the value of r_2 .

.....

(iii) Do you expect to receive an emergent ray from surface AC for the above incident ray?
Explain your answer.

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(iv) Complete the corresponding path of the ray in the diagram given below.

