10 (a) Figure 10 shows an opaque screen in which there are two narrow parallel slits, P and Q, separated by a distance d.

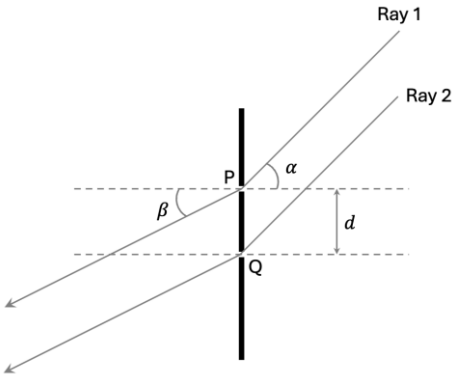

Figure 10

A beam of monochromatic light of wavelength λ is incident on the screen at an angle α to the normal. Consider light emerging from the slits at an angle β to the normal.

Find an expression for the total path difference between rays 1 and 2 as a result of passing through the slits. Hence find the condition for the light emerging at angle β to be of maximum intensity. [2 mark]

(b) Show that, for small values of the angle β, the angular separation between adjacent maxima in the emergent light is independent of the angle of incidence α.

[3 marks]

- End of paper -