3 A student sets up the apparatus illustrated in Fig. 3.1 in order to observe two-source interference fringes. The double slit with slit separation 0.800 mm, situated 2.50 m from the screen, is illuminated with coherent red light of wavelength 690 nm. Fringes are observed on the screen.
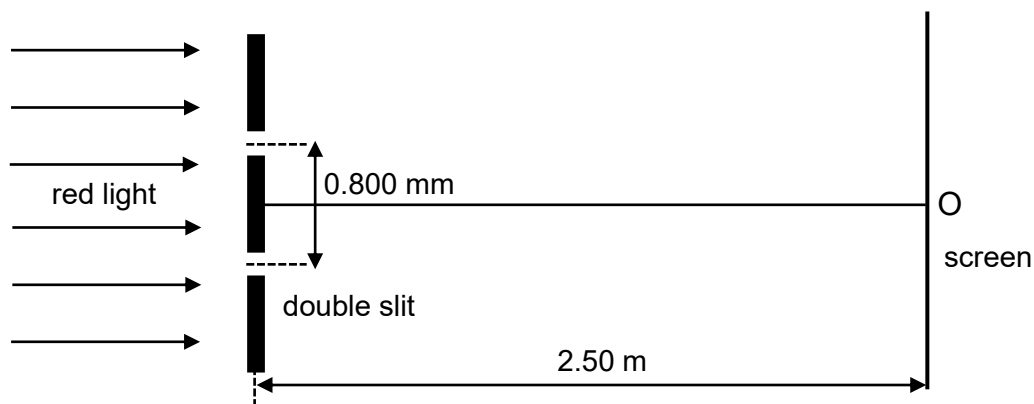

Fig. 3.1

(a) State two conditions necessary for two source interference fringes to be observed.

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.... [2]

(b) Explain why a maxima is always observed at Point O.

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....

.... [2]

(c) Calculate the distance from O to the second minima observed on the screen.

separation = ……….....………......…………… m   [3]

(d) Describe the changes, if any, that occur in the separation of the fringes and the difference in the brightness between bright and dark fringes observed on the screen, when each of the following changes is made separately.

(i) increasing the intensity of the red light incident on the double slit,

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(ii) increasing the distance between the double slit and the screen.

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[Total: 11]