3 **(a)** Explain the *principle of superposition.*

.....

.....

.....[2]

(b) Coherent light of wavelength 590 nm is incident normally on a double slit, as shown in Fig. 3.1.

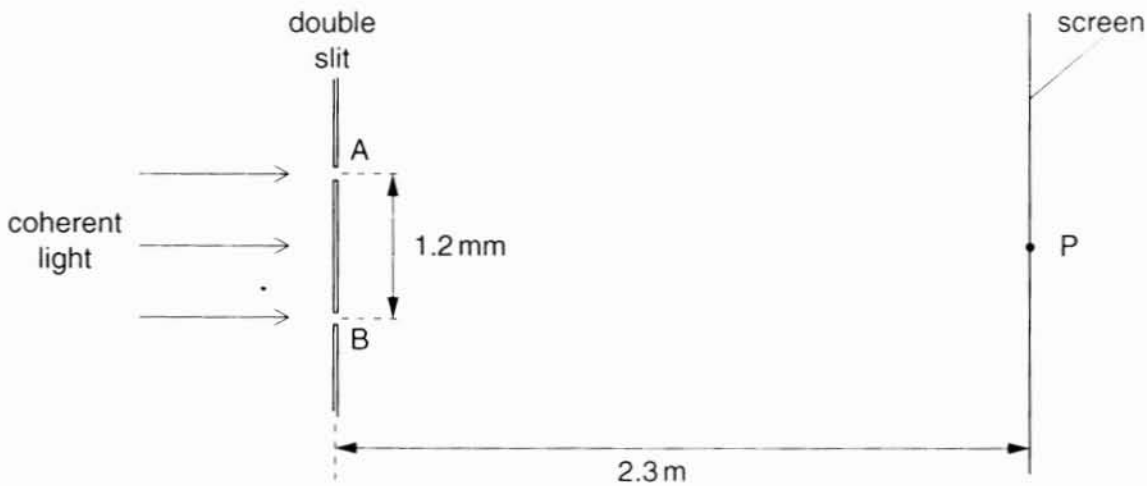

Fig. 3.1 (not to scale)

The separation of the slits A and B in the double slit arrangement is 1.2 mm.

Interference fringes are observed on a screen placed parallel to the plane of the double slit and 2.3 m from it.

Assume that, for the fringes near point P on the screen, the light reaching the screen from slit A alone has intensity I and that from slit B alone has intensity $\frac{1}{3}I$.

(i) Determine the separation of the bright fringes.

separation = ... m [3]

For Examiner's Use

(ii) Point P on the screen is equidistant from the two slits A and B.

Determine the intensity, in terms of I, of a dark fringe near P.

intensity = ... I [3]