5 (a) State what is meant by the *diffraction* of a wave.

....

....

.... [2]

(b) A double slit consists of two parallel slits, each of width 0.100 mm. The separation of the slits is 1.40 mm, as illustrated in Fig. 5.1.
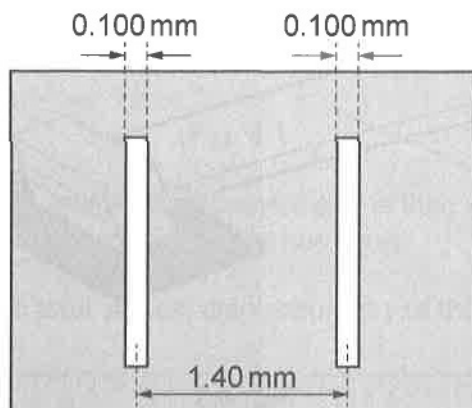

Fig. 5.1 (not to scale)

Parallel light of wavelength 590 nm is incident normally on the double slit. A screen is placed parallel to the plane of the double slit at a distance of 2.60 m from the slits, as illustrated in Fig. 5.2.
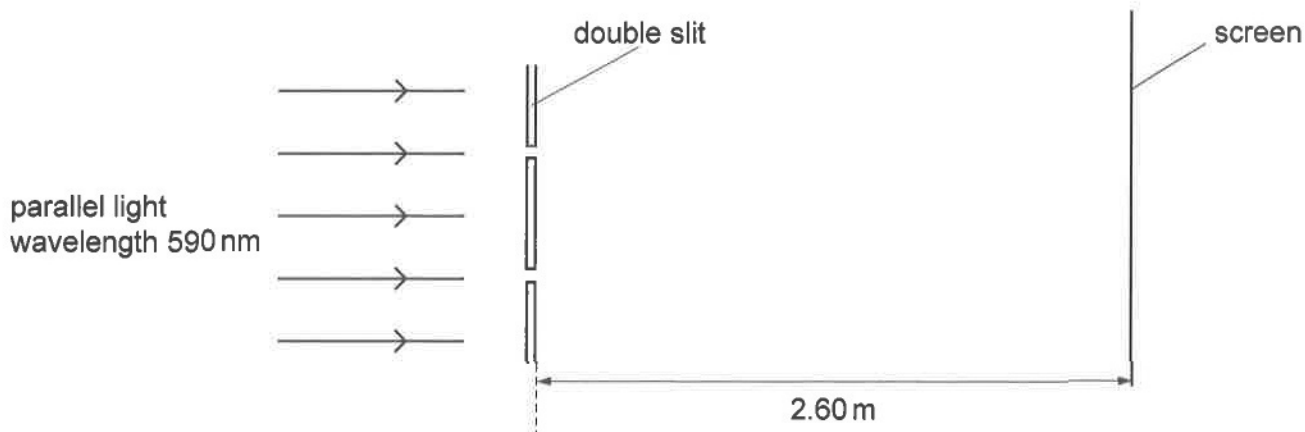

Fig. 5.2 (not to scale)

(i) Initially, one of the two slits is covered.

Calculate the width of the central fringe of the single-slit diffraction pattern seen on the screen.
Give your answer to three significant figures.

fringe width = ... m [3]

(ii) Both slits are now uncovered.

Estimate the number of fringes resulting from double-slit interference that are seen within the central maximum produced by single-slit diffraction.

number = ... [3]

[Total: 8]