4 **(a)** **(i)** By reference to the direction of propagation of energy, state what is meant by a *longitudinal* wave.

.....

..... [1]

(ii) State the principle of superposition.

.....

.....

..... [2]

(b) The wavelength of light from a laser is determined using the apparatus shown in Fig. 4.1.

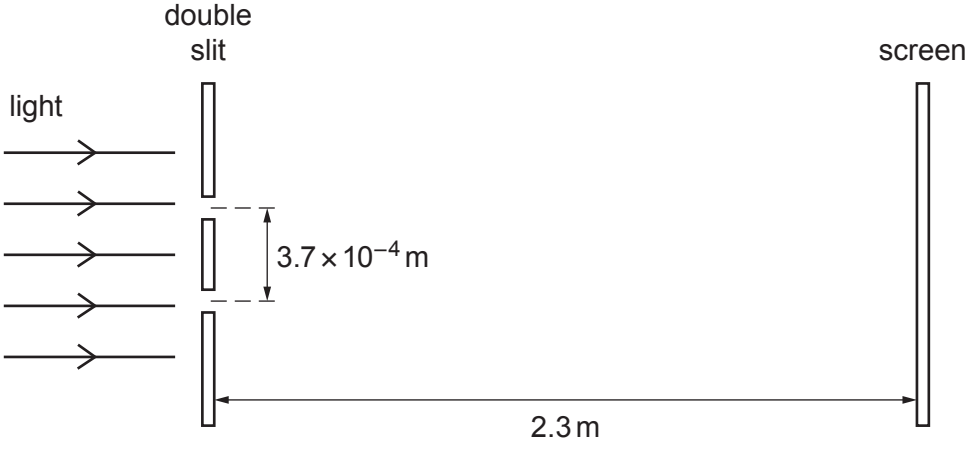

Fig. 4.1 (not to scale)

The light from the laser is incident normally on the plane of the double slit.
The separation of the two slits is 3.7×10^{-4} m. The screen is parallel to the plane of the double slit. The distance between the screen and the double slit is 2.3 m.

A pattern of bright fringes and dark fringes is seen on the screen. The separation of adjacent bright fringes on the screen is 4.3×10^{-3} m.

(i) Calculate the wavelength, in nm, of the light.

wavelength = ... nm [3]

(ii) The intensity of the light passing through each slit was initially the same. The intensity of the light through **one** of the slits is now reduced.

Compare the appearance of the fringes before and after the change of intensity.

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.....

.....

..... [2]

[Total: 8]