6 **(a)** Coherent visible light of a single frequency is incident normally on a double slit. This produces a pattern of bright and dark interference fringes on a screen, as illustrated in Fig. 6.1.

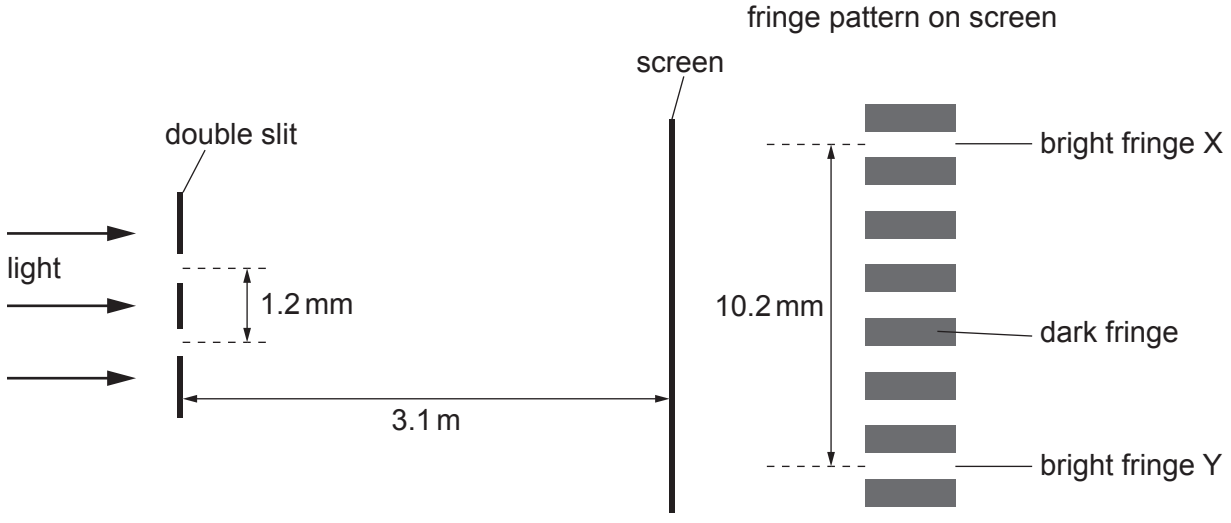

Fig. 6.1 (not to scale)

There are seven bright fringes.

(i) Explain how the pattern of bright and dark interference fringes is formed.

.....

.....

.....

.....

.....

..... [3]

(ii) The distance between the centres of bright fringe X and bright fringe Y in the pattern is 10.2 mm. The slit spacing is 1.2 mm. The distance from the slits to the screen is 3.1 m.

Calculate the wavelength of the light incident on the slits.

wavelength = ... m [3]

(iii) The light is replaced by different visible light with a shorter wavelength.

State how the new fringe separation will compare to the original fringe separation.

..... [1]

(b) A stationary wave is formed on a stretched string AB, as shown in Fig. 6.2.

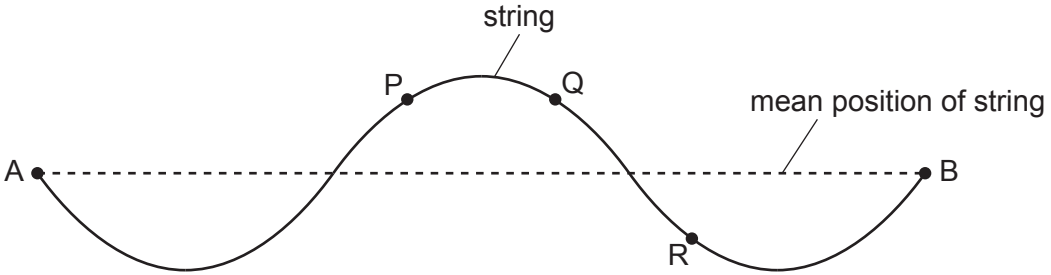

Fig. 6.2

P, Q and R are points on the string.

(i) On Fig. 6.2, draw a cross (×) to show the position of a node. [1]

(ii) State the phase difference between P and Q.

phase difference = ... ° [1]

(iii) State the phase difference between P and R.

phase difference = ... ° [1]

[Total: 10]