- 1 What part does <u>diffraction</u> play in Young's double slit experiment.
- 2 A source of parallel monochromatic red light illuminates an opaque screen in which there is a slit which is narrow compared to the wavelength of radiation used.
 - (a) Describe with the aid of a diagram the resulting pattern on a detector screen when the screen is a long way from the slit.
 - (b) In what way will the pattern change if the slit was illuminated with blue light?
 - (c) Describe the appearance of the pattern when the slit is illuminated with white light.
- 3 The diagrams below show two single slit diffraction patterns made with the same slit under the same conditions with monochromatic light. The only difference is that in one case the wavelength was longer. Which of the diagrams is the one taken with the longer wavelength light?



- 4 What part does single slit diffraction play in Young's double slit apparatus? Answer by referring to the single slit at the front and to the two adjacent single slits that make up the double slit.
- 5 The diagram below shows the intensity curve for a double slit interference pattern. The dotted line shows the diffraction effects that result from the diffraction that occurs at each of the two slits



Describe how the pattern would change if the slits were:

- (a) closer together without any change in their size.
- (b) kept the same distance apart but made thinner.

6 The five diagrams below represent the double slit interference patterns (we could also call them diffraction patterns) obtained using the same source of monochromatic light. In each case the distance to the screen was the same.



- (a) In which case was the distance between the slits the largest?
- (b) In which case was the distance between the slits the smallest?
- (c) In which case were the slits the thinnest?
- (d) In which case is the fourth order interference maximum missing?
- (e) Sketch a graph of intensity versus distance across the screen for case A.