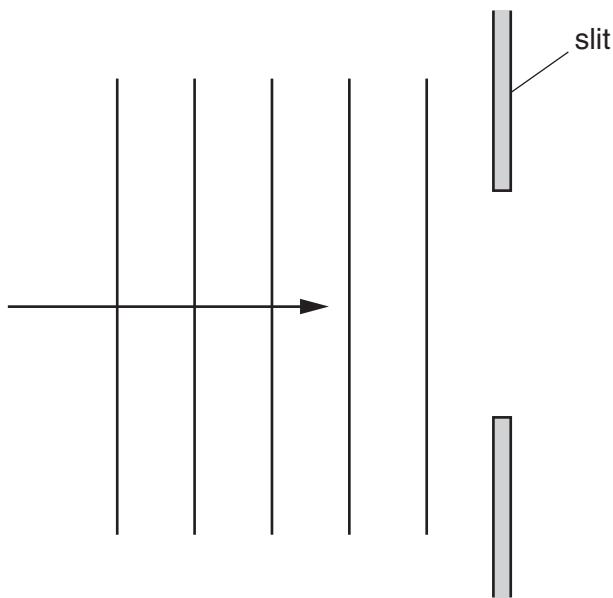


- 5 (a) State what is meant by the *diffraction* of a wave.

.....  
.....  
.....

[2]

- (b) Plane wavefronts are incident on a slit, as shown in Fig. 5.1.

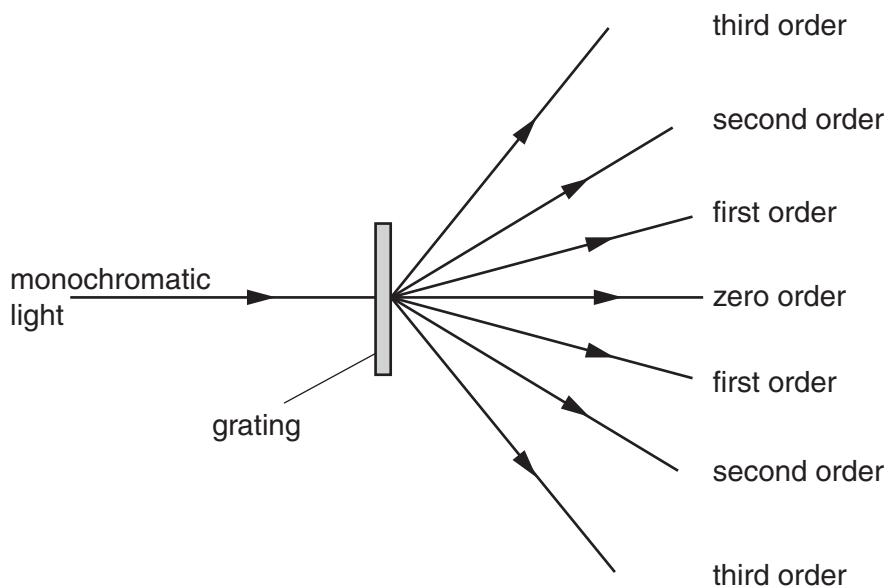


**Fig. 5.1**

Complete Fig. 5.1 to show four wavefronts that have emerged from the slit.

[2]

- (c) Monochromatic light is incident normally on a diffraction grating having 650 lines per millimetre, as shown in Fig. 5.2.



**Fig. 5.2**

An image (the zero order) is observed for light that has an angle of diffraction equal to zero.

For incident light of wavelength 590 nm, determine the number of orders of diffracted light that can be observed on each side of the zero order.

$$\text{number} = \dots \quad [3]$$

- (d) The images in Fig. 5.2 are viewed, starting with the zero order and then with increasing order number.  
State how the appearance of the images changes as the order number increases.

.....  
..... [1]