5

A beam of red laser light is incident normally on a diffraction grating.

(a)

Diffraction of the red laser light occurs at each slit of the grating. The light emerging from the slits are coherent.

Explain what is meant by the following terms with reference to the situation given:

(i)

diffraction

……………………………………………………..........……………………………

…………………………………………………………………………………..

[1]

(ii)

coherent

……………………………………………………….........…..…………………………….

………………………………………………………………………………………..

[1]

(b)

The wavelength of the laser light is 650 nm. The angle between the two **third** order diffraction maxima is 68°, as illustrated in Fig. 5.1.

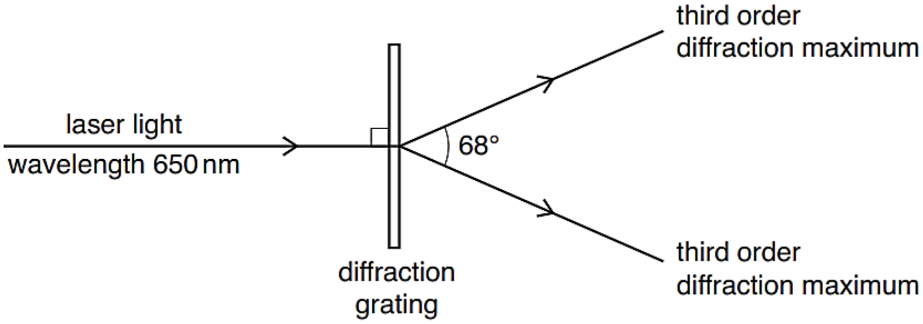

Fig. 5.1

(i)

Determine the angle between the two **second** order maxima.

angle = ... °

[2]

(ii)

Determine the maximum order that can be observed from.

order = ...

[2]

(iii)

The red laser light is replaced with blue laser light.

State and explain the change, if any, to the angle between the **third** order diffraction maxima.

……………………………………………………...........…………………………..

……………………………………………………...........…………………………..

……………………………………………………………………………..

[1]