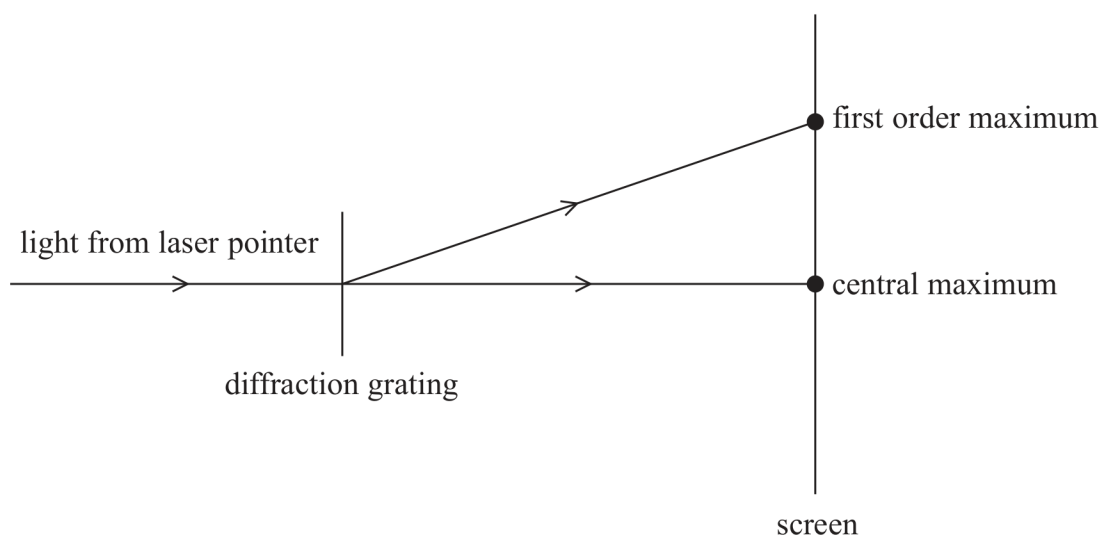


18 A teacher has a laser pointer. The laser pointer emits a narrow beam of plane polarised light.

- (a) Describe how the teacher can demonstrate that the light from the laser pointer is plane polarised.

(2)

- (b) The teacher shines light from the laser pointer onto a diffraction grating as shown. This produces a diffraction pattern on a screen.



- (i) The diffraction grating equation is

$$n\lambda = d \sin \theta$$

State the quantity represented by  $d$ .

(1)



(ii) The teacher made the following measurements:

distance from central maximum to first order maximum = 1.61 m

distance from diffraction grating to screen = 2.74 m

The wavelength of the light from the laser pointer was 532 nm.

Calculate the number of lines per millimetre on the diffraction grating.

(3)

Number of lines per millimetre = .....

(iii) Using this diffraction grating and laser pointer, only the first order maxima and the central maximum are produced.

Explain how the teacher, using the same laser pointer, could improve his value for the number of lines per millimetre.

(3)

(Total for Question 18 = 9 marks)