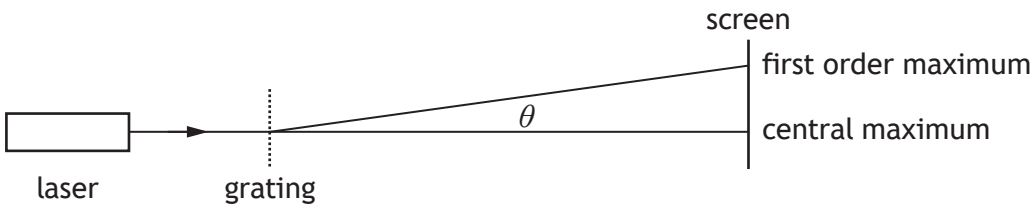
10. A student carries out an experiment to investigate the effect of a grating on beams of light from three different lasers.



not to scale

The three different lasers produce red, green and blue light respectively.

Each laser beam is directed in turn towards the grating.

The grating has a slit separation of $3{\cdot}3 \times 10^{-6}$ m.

(a) State which of these three colours of laser light would produce the smallest angle θ between the central maximum and the first order maximum.

Justify your answer. **3**

10. (continued)

(b) The angle θ between the central maximum and the first order maximum for light from one of the lasers is 8·9°.

(i) Calculate the wavelength of this light. **3**

Space for working and answer

(ii) Determine the colour of the light from this laser. **1**

(iii) Another student suggests that a more accurate value for the wavelength of this laser light can be found if a grating with a slit separation of $5{\cdot}0 \times 10^{-6}$ m is used.

Explain why this suggestion is incorrect. **2**

[Turn over