6 **(a)** State what is meant by diffraction.

.....

..... [1]

(b) Light of wavelength 720 nm in a vacuum is incident normally on a diffraction grating as shown in Fig. 6.1.

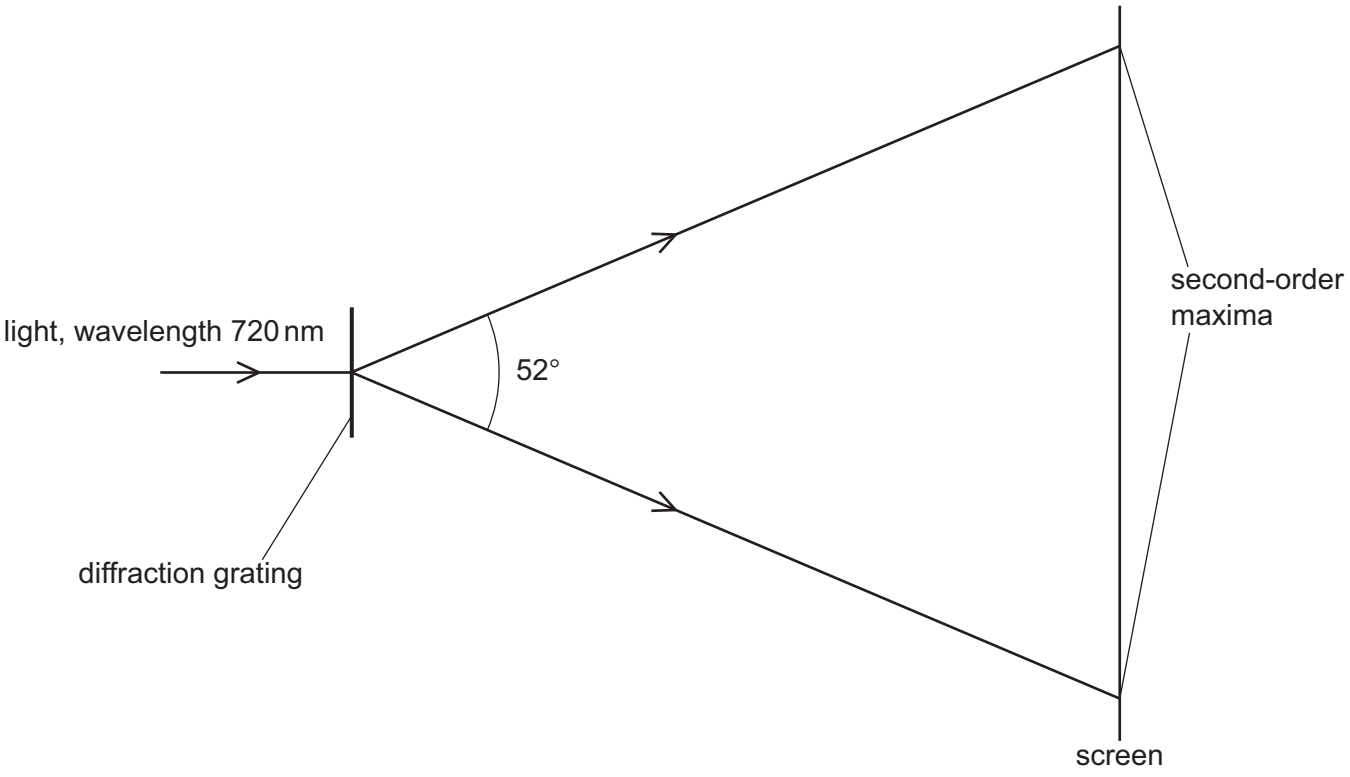

Fig. 6.1 (not to scale)

A screen is parallel to the grating. An interference pattern is seen on the screen and the angle between the **second**-order maxima is 52°.

(i) Calculate the frequency of the light.

frequency = ... Hz [2]

(ii) Calculate the number of lines per unit length in the diffraction grating.

number per unit length = ... m^{-1} [3]

(iii) The light in Fig. 6.1 is now replaced with light of a different wavelength λ. It is observed that the third-order maxima of this light are at the same positions as the second-order maxima of the light in Fig. 6.1.

Calculate, in nm, the wavelength λ.

λ = ... nm [2]

[Total: 8]