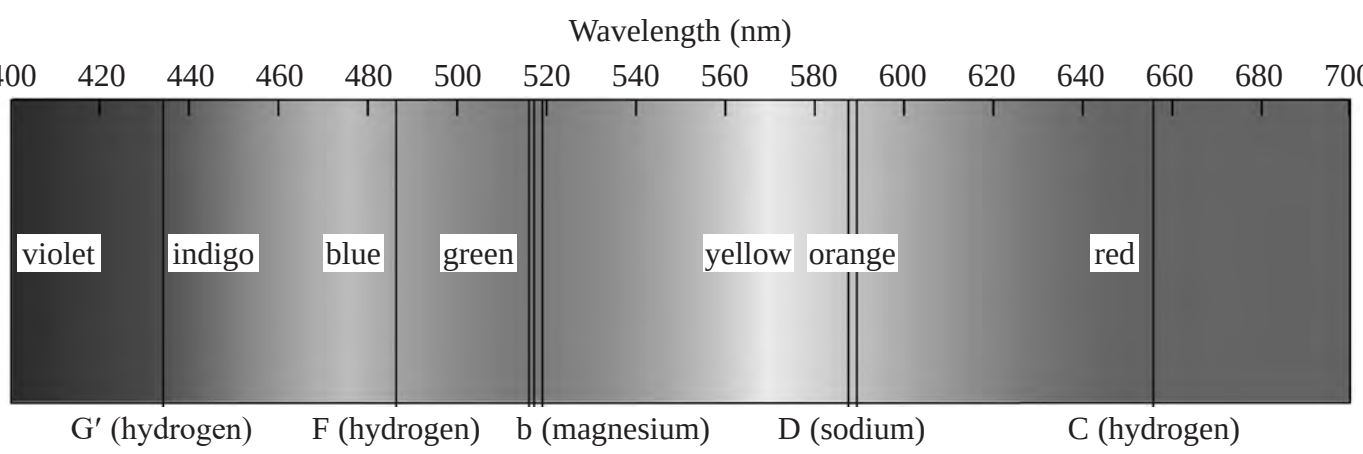
17 Scientists can analyse light from stars that has passed through a diffraction grating.

*(a) Explain the pattern produced when a mixture of blue and red light, from the same source, passes through a diffraction grating.

(6)

(b) A spectrum of the visible light emitted by a particular star is shown.



(Source: © Universal Images Group North America LLC/Alamy Stock Photo)

(i) Light interacts with atoms as it passes through the atmosphere of the star.

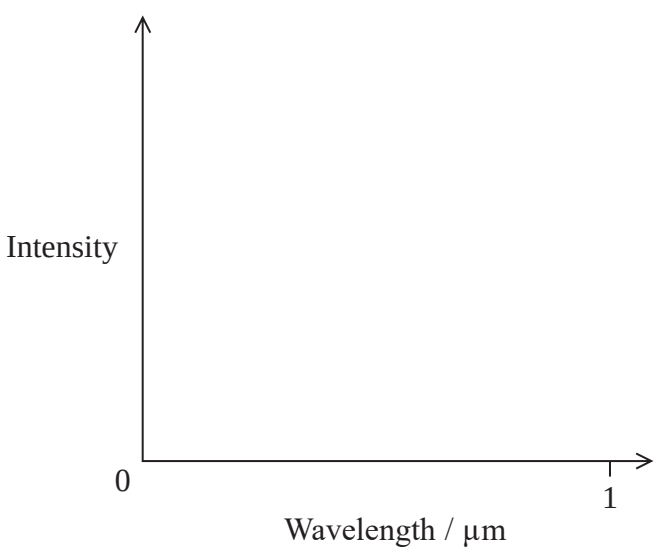
Explain how this leads to the formation of the dark lines within the spectrum.

(4)

(ii) The surface temperature of the star is 5800 K.

On the axes below, sketch a graph of the intensity of radiation against the wavelength of that radiation for this star.

(4)



(iii) This star is a main sequence star.

Explain why main sequence stars do not collapse due to gravitational forces.

(2)

(Total for Question 17 = 16 marks)