

18 Wolf 359 is a red dwarf star. The distance of the star from Earth was first determined from parallax measurements made by the astronomer Max Wolf.

- (a) (i) The parallax angle was 2.01×10^{-6} rad.

Calculate the distance, in metres, of Wolf 359 from Earth.

mean distance from Earth to Sun = 1.50×10^{11} m

(2)

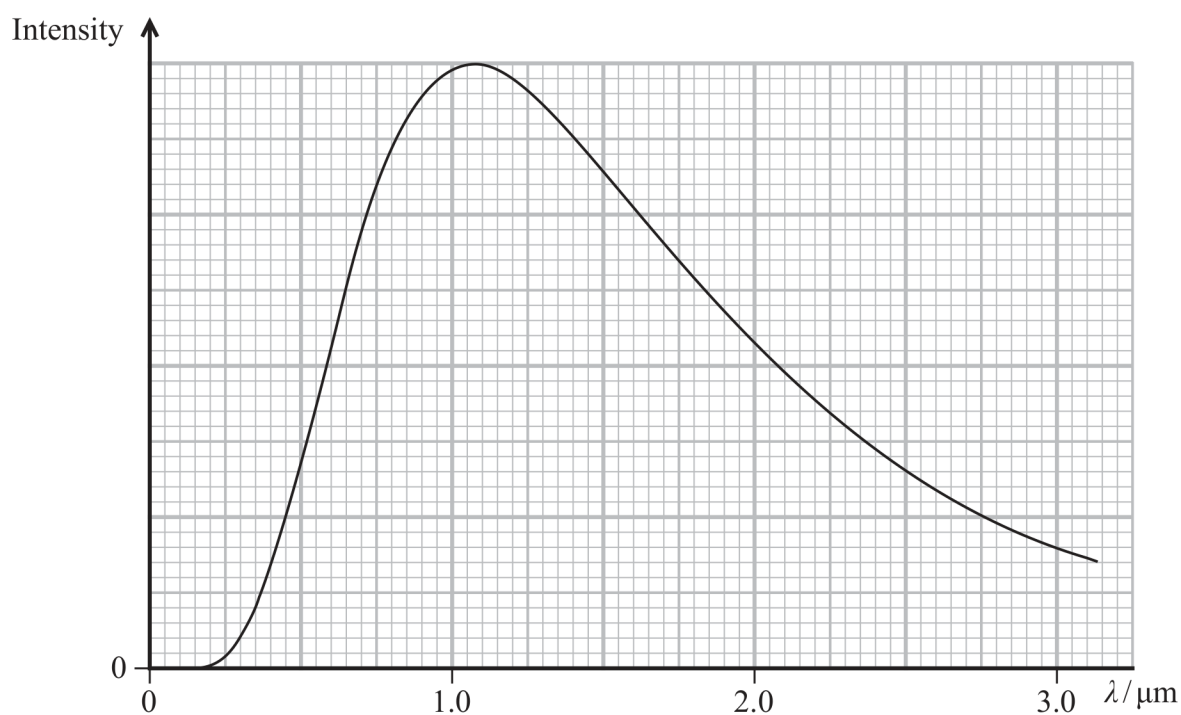
Distance of Wolf 359 from Earth = m

- (ii) Explain why parallax measurements can only be used to determine the distances to a relatively small number of stars.

(2)



- (b) The graph shows how the intensity of radiation from the star Wolf 359 varies with wavelength.



- (i) Show that the surface temperature of Wolf 359 is about 2700 K.

(3)

- (ii) The radius of the Sun is R_{Sun} . The radius of Wolf 359 is $0.16 R_{\text{Sun}}$.

It is claimed that the luminosity of Wolf 359 is less than 0.1% of the luminosity of the Sun, L_{Sun} .

Deduce whether this claim is correct.

$$R_{\text{Sun}} = 6.96 \times 10^8 \text{ m}$$

$$L_{\text{Sun}} = 3.83 \times 10^{26} \text{ W}$$

$$T = 2700 \text{ K}$$

(3)

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(Total for Question 18 = 10 marks)