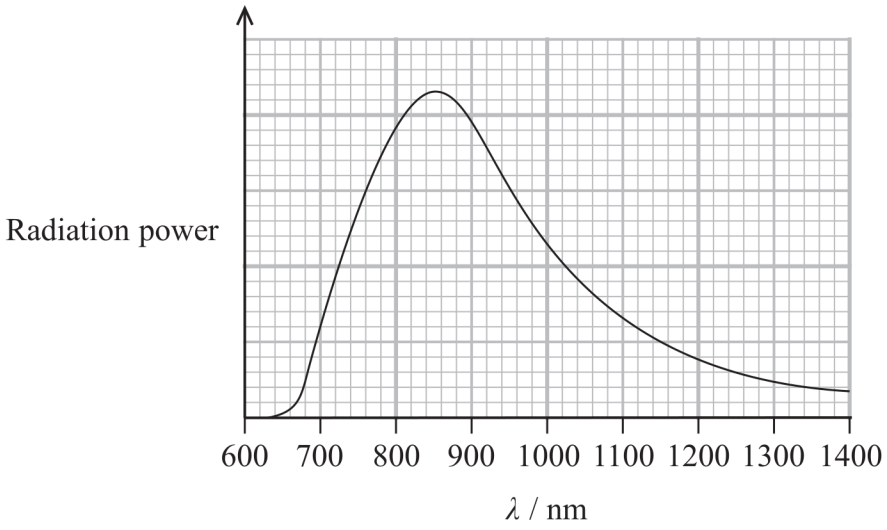
21 Ross-154 is one of the closest stars to the Sun. The graph shows how the power radiated from Ross-154 depends upon wavelength λ.



(a) (i) Show that the surface temperature of Ross-154 is about 3000 K.

(3)

.....

.....

.....

.....

.....

(ii) A website states that the luminosity of Ross-154 is less than 0.5% of the luminosity of the Sun, L_{Sun}.

Evaluate whether this statement is correct.

radius of Ross-154 = 1.18×10^{8} m
$L_{Sun} = 3.83 \times 10^{26}$ W

(5)

(b) Scientists have observed an Earth-type planet in orbit around Ross-154. The radius of the orbit is 0.096 AU.

Calculate the time for this planet to make one orbit of Ross-154.

1 AU = 1.50×10^{11} m
mass of Ross-154 = 3.38×10^{29} kg

(3)

Time for one orbit = ...

(Total for Question 21 = 11 marks)