

10 (a) (i) State what is meant by the luminosity of a star.

.....  
 ..... [1]

(ii) Explain how standard candles are used to determine the distance to a galaxy.

.....  
 .....  
 .....  
 .....  
 ..... [3]

(b) The Sun rotates on its axis. Points X, Y and Z are on the equator of the Sun as shown in Fig. 10.1.

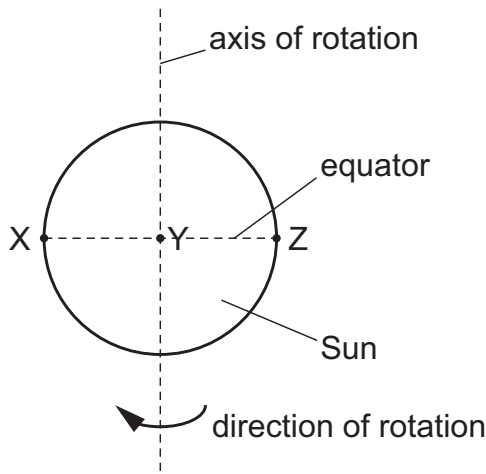


Fig. 10.1

The wavelengths of light from points X and Y are observed and recorded in Table 10.1.

Table 10.1

observed wavelength from X/nm	observed wavelength from Y/nm
656.2877	656.2831

(i) The Sun rotates with a period of  $2.07 \times 10^6$  s.

Show that the radius of the Sun is  $6.93 \times 10^8$  m.

[3]

(ii) State and explain how the expected wavelength of the light observed from Z compares with the emitted wavelength.

.....  
 .....  
 ..... [2]

(iii) The luminosity of the Sun is  $3.8 \times 10^{26}$  W.

Use the information in (b)(i) to calculate the surface temperature of the Sun.

temperature = ..... K [2]

[Total: 11]