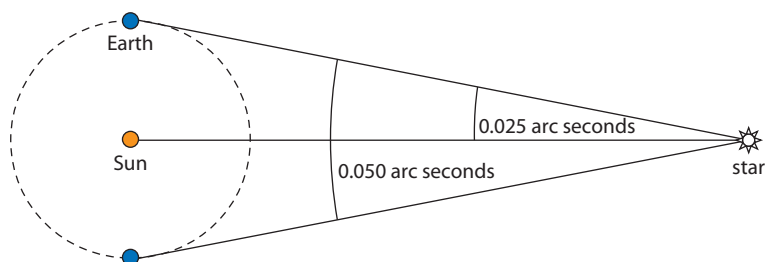


Self-test questions

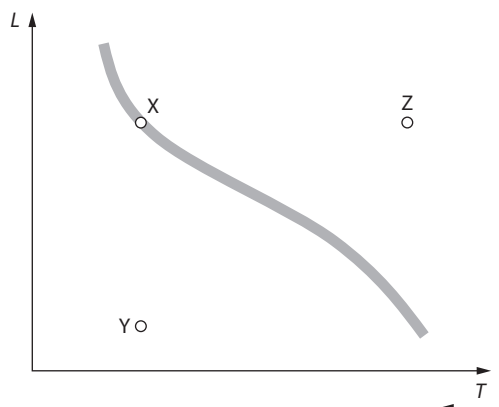
Option D (HL)

- 1 A star has double the radius and temperature of our Sun. The star's luminosity is how many times the Sun's luminosity?
A 4
B 8
C 32
D 64
- 2 A main-sequence star has double the mass of our sun. The star's luminosity is about how many times larger than that of the Sun?
A 2
B 4
C 8
D 10
- 3 The luminosity ratio of two stars X and Y is $\frac{L_X}{L_Y} = 32$ and the ratio of their apparent brightnesses is $\frac{b_X}{b_Y} = 8$. What is the value of the ratio $\frac{d_X}{d_Y}$ of their distances?
A 2
B 4
C $\frac{1}{2}$
D $\frac{1}{4}$
- 4 The diagram below shows the earth in its orbit around the Sun, and a distant star. What is the distance to the star?



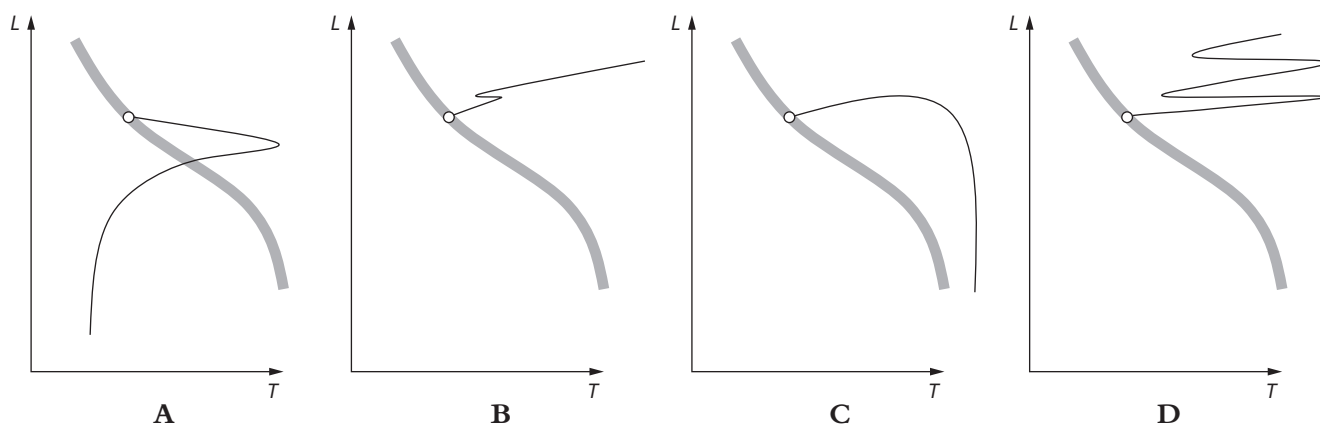
- A 40ly
- B 40pc
- C 20ly
- D 20pc

- 5 The HR diagram below shows three stars, X, Y and Z.



Which list gives the correct relationship between the radii of the stars?

- A** $R_Y < R_X = R_Z$
 - B** $R_Y = R_X < R_Z$
 - C** $R_Y < R_X < R_Z$
 - D** $R_Y > R_X = R_Z$
- 6 The sequence of events in the evolution of a main-sequence star of 1 solar mass include:
- A** red giant \rightarrow planetary nebula \rightarrow white dwarf
 - B** super red giant \rightarrow planetary nebula \rightarrow neutron star
 - C** red giant \rightarrow supernova \rightarrow white dwarf
 - D** super red giant \rightarrow supernova \rightarrow neutron star
- 7 On the HR diagrams below, which is the evolutionary path of a main-sequence star of 20 solar masses?



- A**
- B**
- C**
- D**

- 8 A line in the spectrum of a distant galaxy is measured to have a redshift of 0.20. The ratio of the size of the Universe when the light is received to the size of the universe when the light was emitted is:
- A 1.20
 - B $\frac{1}{1.20}$
 - C 0.20
 - D $\frac{1}{0.20}$
- 9 The existence of dark matter is inferred from:
- A fluctuations in the cosmic background radiation
 - B deviations from Hubble's law
 - C rotation curves of galaxies
 - D the fact that the universe is accelerating.
- 10 Elements with nucleon numbers above about 60 were formed:
- A during the Big Bang
 - B in fission reactions in stars
 - C in fusion reactions in stars
 - D in supernovae.