Self-test questions

Option D (SL)

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

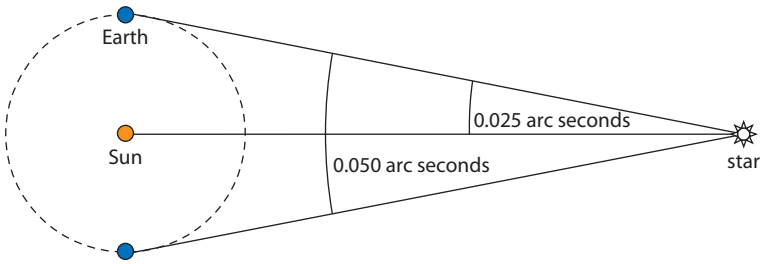
2 A main-sequence star has double the mass of our sun. The star's luminosity is about how many times larger than that of the Sun?

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?

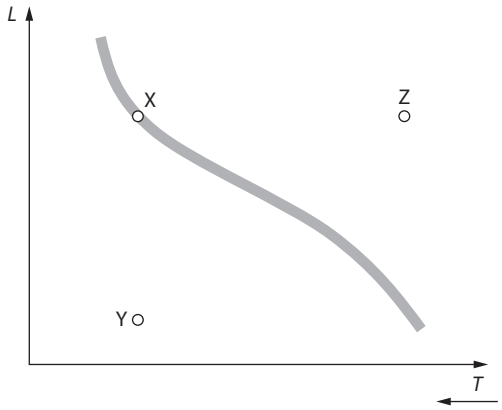
A 2
B 4
C $\frac{1}{2}$
D $\frac{1}{4}$

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 40 ly
B 40 pc
C 20 ly
D 20 pc

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



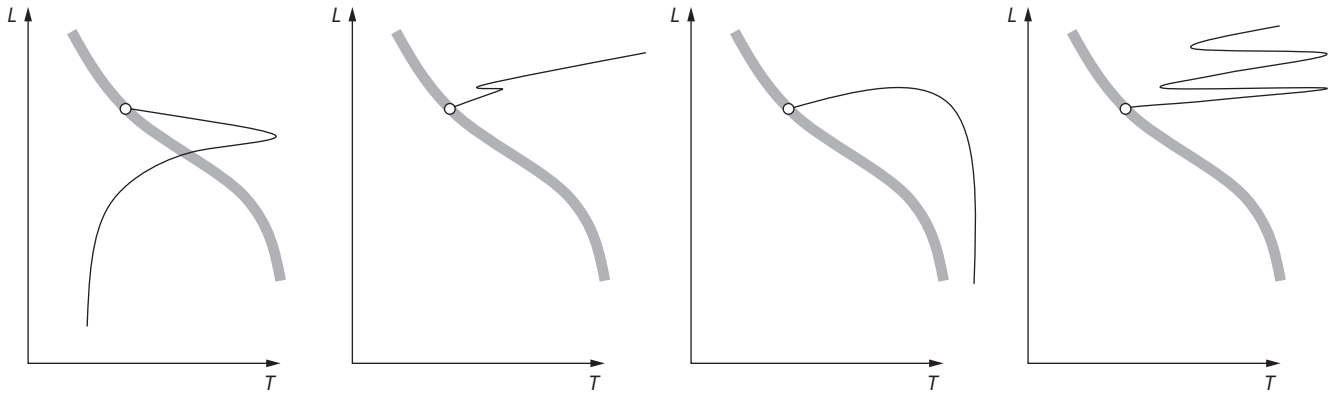
Which list gives the correct relationship between the radii of the stars?

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 → planetary nebula → white dwarf
B red supergiant → planetary nebula → neutron star
C red giant → supernova → white dwarf
D red supergiant → supernova → neutron star

7 Which path on the HR diagram below 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 Chandrasekhar limit denotes the largest mass of:

A a main-sequence star

B a white dwarf

C a red giant

D a neutron star

10 The spectrum of a galaxy shows a redshift of z. The Hubble constant is H_0. What is the distance to the galaxy?

A $\frac{cz}{H_0}$

B $\frac{z}{cH_0}$

C $\frac{H_0 z}{c}$

D $\frac{cH_0}{z}$