*Name*_____

Discussion Questions

1) Briefly explain how the Sun became hot enough for nuclear fusion.

2) Explain why stars more massive than the Sun live shorter main sequence lives than stars less massive than the Sun, despite having more fuel available for nuclear reactions.

3) Briefly describe how a star forms.

4) Briefly summarize the stages of life for a high-mass star.

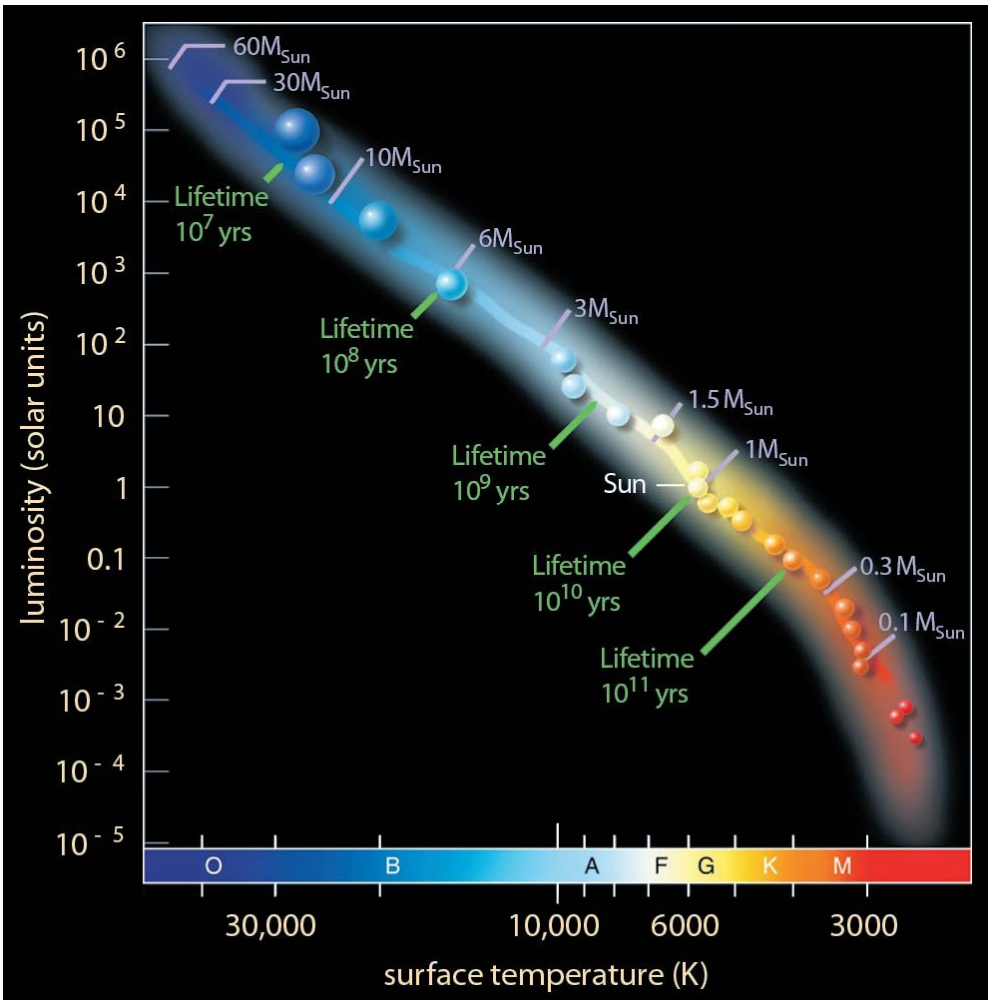
5) Briefly describe how a nova event occurs.

6) Two stars, Tom and Jerry, have the same spectral type. Tom is luminosity class V and Jerry is luminosity class I. Which star is bigger? Which star is more luminous? Which star has a hotter surface temperature? Explain your answers.

7) Two stars, Fred and Barney, are of the same size. Fred has spectral type F, while Barney has spectral type B. Which one is more luminous? What are their relative locations on the HR diagram?

8) The stellar spectral sequence, in order of decreasing temperature, is (Hint: oh be a fine ...)

A) OBAFGKM.
B) OBAGFKM.
C) BAGFKMO.
D) OFBAGKM.
E) ABFGKMO.



9) What is the approximate surface temperature of an F star?
A) 7,000 K B) 5,000 K C) 6,000 K D) 12,000 K

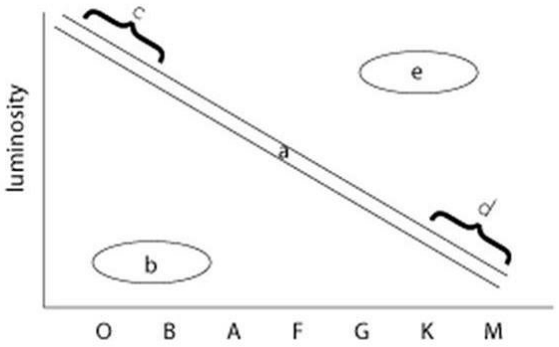
10) What is the approximate surface temperature of a B star?
A) 6,000 K B) 40,000 K C) 20,000 K D) 8,000 K

11) What is the spectral type of a main sequence star with a luminosity 100 times greater than the sun?
A) A B) O C) G D) M

12) What is the approximate luminosity of a main–sequence M star?
A) 0.01 solar B) 10 solar C) 10^{-6} solar D) 1 solar

13) A star is observed with a surface temperature of 3,000 K and a luminosity of 10^{-2} solar. What is the approximate mass of this star?
A) 0.2 Msun B) 0.9 Msun
C) 0.5 Msun D) The mass cannot be determined.

The sketch below shows groups of stars on the H–R diagram, labeled (a) through (e); note that (a) represents the *entire* main sequence while (c) and (d) represent only small parts of the main sequence.



14) Which group represents stars that are *cool and dim*?
A) a B) b C) c D) d E) e

15) Which group represents stars of the *largest radii*?
A) a B) b C) c D) d E) e

16) Which group represents *the most common type of stars*?
A) e B) b C) c D) d

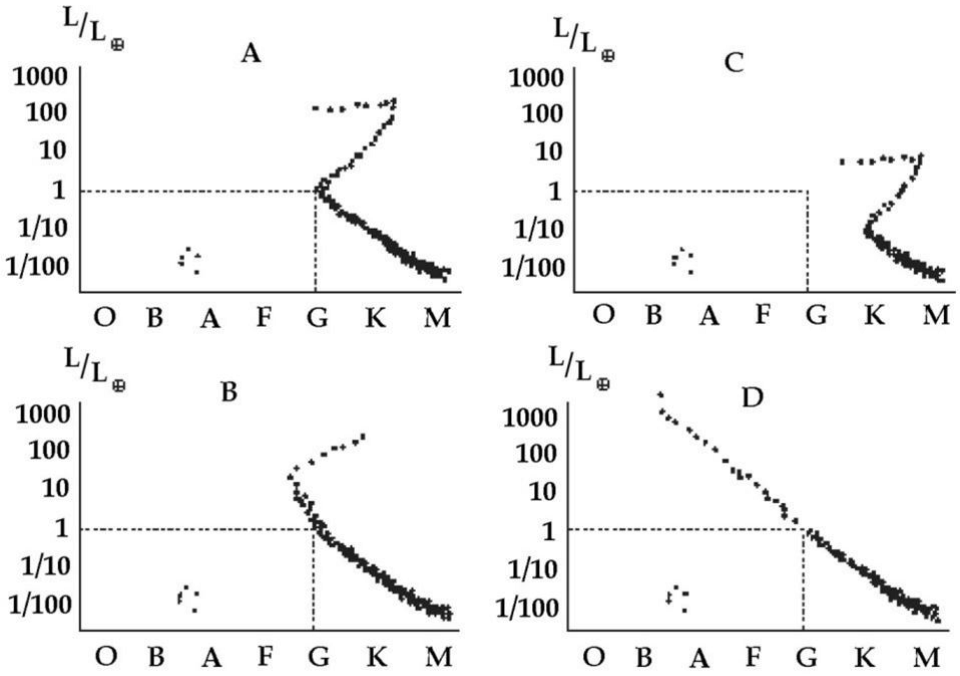
17) Which group represents stars that are *extremely bright and emit most of their radiation as ultraviolet light*?
A) a B) b C) c D) d E) e

18) Which group represents stars with *the longest main–sequence lifetimes*?
A) a B) b C) c D) d E) e

19) Which group represents stars *fusing hydrogen in their cores*?
A) a B) b C) c D) d E) e

20) Which group represents stars that have *no ongoing nuclear fusion*?
A) a B) b C) c D) d E) e

The following questions refer to the representations below of H–R diagrams for different clusters of stars. In each diagram, the dotted lines locate the position of the Sun.



21) Which cluster is the youngest?

22) Which cluster is the oldest?

Hint: Look a the HR diagram in the text that shows the position of red super giants.

23) Each choice below lists a spectral type and luminosity class for a star. Which one is a *red supergiant*?

A) spectral type M1, luminosity class V
B) spectral type O9, luminosity class I
C) spectral type G2, luminosity class V
D) spectral type M2, luminosity class I