

Name:

ASTRONOMY 1102 - Section 1

Instructor: Juhan Frank

Fall 1999

Homework # 5 due Fri. Oct. 29

Stars and their Radiation

1) Of the spectral classes OBAFGKM which class has the strongest Hydrogen lines? What is the surface temperature of that class? Consider the adjacent spectral class of lower temperature: why are Hydrogen lines weaker? Now consider the adjacent spectral class of higher temperature: why are Hydrogen lines weaker when the temperature is higher?

2) Consider a binary that we cannot resolve with telescopes but whose light curve shows periodic drops in the apparent brightness when one star passes in front of the other. Suppose also that the spectrum shows just one set of absorption lines that shift periodically to the red and the blue with the same period seen in the light curve.

a) What kind of binary is this?

b) During minimum light in the light curve what is the shift in spectral lines?

3) Use the HR diagrams in the book to answer (approximately) the following questions:

a) What is the luminosity and radius of a B0V star?

b) What is the surface temperature and radius of an M supergiant?

c) What is the radius of a typical white dwarf?

d) What is the luminosity and radius of the coolest of red dwarfs?

4) HR diagrams of clusters:

a) Do problem 8 at the end of the chapter.

b) Now use the main sequence lifetimes given on Fig. 15.12 to actually estimate the ages of the four clusters.

c) Which - if any - of the four clusters shown is a globular cluster?