Quiz 3

1. The boiling granular appearance of the sun's photosphere is produced by
   A. strong magnetic fields       C. poor seeing conditions in the earth's atmosphere
   B. a Doppler shift             D. convection

2. The hottest layer of the sun, the _______, is most visible to the naked eye during a solar eclipse.
   A. photosphere       B. corona       C. ionosphere       D. magnetosphere

3. We feel sure that the sun is now fueled by nuclear energy rather than by energy left over from its gravitational contraction because
   A. we don't see the sun contracting
   B. the spectrum looks like nuclear production
   C. the energy from gravitational contraction can't last long enough
   D. we see helium produced by $4\text{H} \rightarrow \text{He}$

4. Energy is produced at the center of the Sun. By the time it reaches our eyes, it has been transported by
   A. conduction (by collisions between particles)       D. A and B
   B. convection (by bulk motion of matter)             E. B and C
   C. radiation (by photons)

5. If we know the true luminosity (Watts) of a star and measure the apparent brightness
   (Watts/m$^2$) from it we can determine its
   A. mass       B. distance       C. temperature       D. chemical composition

6. About how long does it take light to reach us from the nearest star (other than the sun)?
   A. 40 minutes       B. 40 hours       C. 4 months       D. 4 years

7. If a star has a parallax of 0.1 sec of arc as viewed from the earth, its distance in parsecs is
   A. 0.1       B. 1       C. 10       D. 100

8. Hydrogen Balmer absorption lines are strongest in A-type stars because
   A. A-type stars have more hydrogen
   B. more hydrogen is in the ground state in these stars
   C. more hydrogen is in the second state in these stars
   D. more hydrogen is ionized in these stars
Quiz 4

1. Binary stars, mutually bound to each other by gravitational forces, allow us to derive which important stellar parameter
   A. stellar mass  
   B. surface temperature  
   C. the luminosity  
   D. distance from Earth

2. The most common star in the neighborhood of the sun is a
   A. M main sequence  
   B. G giant  
   C. T Tauri  
   D. A0 star

3. The major source of energy in the early, pre-main sequence life of the Sun was
   A. nuclear fusion  
   B. nuclear fission  
   C. chemical burning of carbon atoms  
   D. heat from gravitational contraction

4. Why does hydrogen fusion only occur in the deep interiors of the Sun (and other stars)?
   A. because this is the only place in the Sun where there is sufficient hydrogen  
   B. because only in the core is the temperature low enough and the density high enough  
   C. because this is the only place in the Sun where the requisite catalysts (C, N, and O) exist in sufficient quantities to permit fusion to occur  
   D. because the requisite conditions of high temperature and high density only occur there

5. The main sequence turnoff point in the H-R diagram of a star cluster tells us the age of a cluster because
   A. there is a gap between the main sequence and red giants  
   B. more luminous, massive stars leave the main sequence sooner than less massive stars  
   C. all stars in a cluster have the same mass  
   D. low-mass stars have longer to reach the main sequence

6. A planetary nebula is
   A. a gas cloud surrounding a planet  
   B. a shell of gases ejected after the helium fusion stage in lower mass stars  
   C. the formation stages of planets around other stars than the Sun  
   D. the cloud of gas produced by a supernova explosion

7. Which physical phenomenon keeps a white dwarf star from collapsing inwards upon itself?
   A. normal gas pressure  
   B. electron degeneracy or "quantum crowding"  
   C. convection currents or updrafts from the nuclear furnace  
   D. the physical size of the neutrons

8. The most likely site for the manufacture of heavy elements (beyond hydrogen and helium) in the Universe is
   A. in cool gas clouds  
   B. in the deep interiors of stars  
   C. in deep space, away from all stars  
   D. in planetary atmospheres
ANSWERS

3-1  D
3-2  B
3-3  C
3-4  E
3-5  B
3-6  D
3-7  C
3-8  C
4-1  A
4-2  A
4-3  D
4-4  D
4-5  B
4-6  B
4-7  B
4-8  B