What You Should Know About "Supernovas"!

1.) What happens to the rotational speed of the core of a star that has supernova'd? (it increases radically)

2.) What is synchronous radiation? (radio waves that are produced when a neutron star is formed—they are highly directional)

3.) What is a pulsar? (fast rotating neutron star—the signal from it comes in as periodic radio wave blips, hence the name "pulsar")

4.) What stops the implosion of a star's core for stars whose core mass is between 1.4 and 1.8 solar masses? (neutrons jammed up against one another)

5.) What stops the implosion of a star's core for stars whose core mass is greater than 1.8 solar masses? (nothing—it becomes a black hole)

6.) What do you end up with when a star whose core mass is between 1.4 and 1.8 solar masses supernova's? (a neutron star)

7.) After its star supernovas, how big is the resulting neutron star? (around 15 kilometers across)

8.) What do you end up with when a star whose core is greater than 1.8 solar masses supernova's? (a black hole)

9.) What is the frequency range of the fastest pulsars? (700 Hz)

10.) What is the name given to the material that is blown outward after a supernova? (supernova remnant)

11.) "Core collapse" is the name given to one kind of supernova. What is the name given to the other kind? (carbon detonation)

12.) The presence or absence of what determines whether you are looking at a Type I or Type II supernova? (hydrogen spectral lines)

13.) To what is the duration of the light curve of a 1a supernova related? (it's luminosity—that's why Type 1a supernovas are Standard Candles)

14.) How often do supernova's happen in the universe? (1 per second)

15.) Consider a core collapse supernova: (around 15 kilometers across)

a.) What kind of star executes a core collapse supernova? (white dwarf)

b.) What kind of system must exist for a core collapse supernova to occur? (the white dwarf must be a part of a binary system)

c.) What is the mechanism that motivates a core collapse supernova? (the white dwarf sucks hydrogen from its binary partner; periodically, the hydrogen shell becomes dense enough to ignite in hydrogen fusion producing a short lived (a few days) expulsion of enormous amounts of energy and matter called a Nova (the energy can increase the luminosity by 60,000 times); not all of the hydrogen is burned, so with time, hydrogen accumulates around the white dwarf's surface; if the mass of the white dwarf reaches 1.4 solar masses (the lower threshold for a supernova), all of the carbon in the dwarf will fuse instantaneously as the dwarf supernovas, hence the name "carbon detonation")