NAME: _____ **DATE:** _____

PHYS 1040 Homework #7

1. Why do some stars pulsate?

2. What is one explanation for how a low-mass star expels its outer layers to make a planetary nebula?

3. Can a white dwarf have mass of 10 solar masses? Why or why not?

4. What is a black hole?

5. How do we know our galaxy is a flat disk?

6. Roughly how big in diameter is our galaxy, and how much mass does it contain?

7. How do the neutrons form in a massive star's remnant core? What other kind of particle is made along with the neutrons?

8. Stars like the Sun probably do not form Iron cores during their evolution because:
   (a) all the Iron is ejected when they become planetary nebulae
   (b) their cores never get hot enough for them to make Iron by nucleosynthesis
   (c) the Iron they make by nucleosynthesis is all fused into Uranium
   (d) their strong magnetic fields keep their Iron in their atmospheres
   (e) none of the above

9. As a star like the Sun evolves into red giant, its core
   (a) expands and cools
   (b) contracts and heats
   (c) expands and heats
   (d) turns into Iron
   (e) turns into Uranium

10. What causes the radio pulses of a pulsar?
   (a) the star vibrates
   (b) the star undergoes nuclear explosions that generate radio emission
   (c) as the star spins, beams of radio radiation sweep through space. If one of these beams points toward Earth, we observe a pulse
   (d) the star's dark orbiting companion periodically blocks the radio waves emitted by the star
   (e) a black hole near the star absorbs energy from it and re-emits it as radio waves

11. The Schwarzschild radius of a body is
   (a) the distance from its center at which nuclear fusion ceases
   (b) the distance from its surface at which an orbiting companion will be broken apart
   (c) the maximum radius a white dwarf can have before it collapses
   (d) the maximum radius a neutron star can have before it collapses
   (e) the radius of a body at which its escape velocity equals the speed of light

12. Astronomers know that interstellar matter (IS clouds) exist because
   (a) they can see it in dark clouds and clouds that absorb light
   (b) the matter creates narrow absorption lines in the spectra of some stars
   (c) they can detect radio waves coming from atoms and molecules in the cold gas
   (d) spacecraft have sampled clouds near Orion
   (e) all of the above except (d)

13. A star radiates most strongly at 400 nanometers (1 nm = 10^{-9} m). What is its surface temperature? *(Hint: use Wien's Law)*
   (a) 400 K
   (b) 4000 K
   (c) 40,000 K
   (d) 75,000 K
   (e) 7500 K