HW8

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1. AGBs
(10 point(s))

In terms of a star's evolutionary life, an asymptotic giant branch (AGB) star is in the

- 1. helium core-burning phase.
- 2. helium shell-burning phase.
- 3. pre-main-sequence phase.
- 4. hydrogen shell-burning phase prior to helium ignition in the core.

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2. Massive Attack
(10 point(s))

After the material in the core of a massive star has been converted to iron by thermonuclear reactions, the core can gain further energy ONLY by

- 1. gravitational contraction.
- 2. thermonuclear fusion of iron into heavier elements.
- 3. nuclear fission or splitting of nuclei.
- 4. absorption of neutrinos.

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3. You and me
(10 point(s))

What is the source of most of the heavy (heavier than iron) elements on the Earth and in our own bodies?

- 1. explosive nucleosynthesis during supernova explosions of massive stars
- 2. nuclear reactions during the formation of the Universe (the Big Bang)

- 3. cosmic ray interactions with hydrogen and helium nuclei in interstellar clouds
- 4. thermonuclear fusion reactions in the cores of massive stars

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4. Super

(10 point(s))

A typical supernova, in the hours following its explosion, is as bright as

- 1. 1000 typical spiral galaxies.
- 2. an entire galaxy.
- 3. 1000 Sun-like stars.
- 4. a million Sun-like stars.

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5. Heavy man

(10 point(s))

Your friend Dumm missed a few classes and wants you to explain why massive stars are like onions at the end of their life. Dumm thinks that it is because being that close to star death makes you cry. Is that correct? Set Dumm straight.

Save Answer

6. Pulsating Nation

(10 point(s))

What is a pulsar?

- 1. a pulsating white dwarf star, fluctuating rapidly in brightness
- 2. a rapidly rotating neutron star, producing beams of radio energy and in some cases, light and X rays
- 3. a pulsating and rotating black hole, producing two jets of gas in opposite directions and pulses of gravitational energy

4. a Cepheid variable star with a period of a few days

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7. Faster

(10 point(s))

Astronomers originally rejected the idea that white dwarfs could rotate fast enough to be responsible for pulsar radiation. But they soon accepted the idea that neutron stars could produce pulsar radiation. Why this difference?

1. The earlier rejection was mistaken. With sufficient evidence astronomers have come to believe that both white dwarfs and neutron stars can produce pulsar radiation.

2. There are two types of white dwarfs: those that produce Type Ia supernova and those that do not. The earlier rejection applied to the second type. It is now believed that the Ia supernova type white dwarfs, along with neutron stars, can produce pulsar radiation.

3. Neutron stars are smaller and even more dense than white dwarfs. Thus they can rotate at tremendous rates without flying apart.

4. Neutron stars are held together by nuclear forces that are much stronger than the gravitational forces operating in white dwarfs. Thus the surface of a neutron star can pulse in and out much more quickly than the surface of a white dwarf.

Save Answer

8. Flashing

(10 point(s))

Two rocket ships are traveling past the Earth at 90% of the speed of light in opposite directions (i.e., they are approaching each other). One turns on a searchlight beam, which is seen by scientists aboard the second spaceship. What speed do the scientists measure for this light? (c = speed of light in a vacuum)

1. 1.8 c (equal to 2 × 0.9 c)

2. 0.9 c

3. 1.9 c (equal to c + 0.9 c)

4. c

Save Answer

9. Friends

(10 point(s))

If you stay on the Earth while a friend races off in a rocket at a speed close to the speed of light then, according to special relativity, you will see a clock on the rocket appear to tick more slowly than the one on your wall. If your friend looks back at your clock then, according to the same theory, the friend will see your clock appear to tick

- 1. at the same speed as the clock on the rocket.
- 2. faster or slower than the clock on the rocket, depending on the direction of travel of the rocket compared to Earth.
- 3. more slowly than the clock on the rocket.
- 4. faster than the clock on the rocket.

Save Answer

10. Black holes suck?

(10 point(s))

Your friend Dumm says that black holes are spooky because we're not exactly sure how they form and they are in space sucking up everything. Fix Dumm's misconceptions.

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