

## Astronomy 100—Quiz 4

Prof. Wang

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**INSTRUCTIONS:** Write your name and your chosen ID number on the computer grading form. Choose the letter of the response that you think *best* answers the question. Use a #2 Pencil on the computer grading form. Thoroughly erase all changed answers and stray marks on the form.

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1. A white dwarf is supported against collapse by
  - A. neutron drip.
  - B. neutrino pressure.
  - C. electron degeneracy pressure.
  - D. neutron degeneracy pressure.
  - E. a central black hole.
  
2. The energy emitted by a white dwarf comes from
  - A. iron fusion
  - B. carbon fusion
  - C. helium fusion
  - D. thermal cooling
  - E. all of the above
  
3. A \_\_\_\_\_ has a radius about the size of the Earth.
  - A. Black hole
  - B. White Dwarf
  - C. Core-collapse supernova
  - D. Brown dwarf
  - E. Supernova Ia
  
4. Which element from the following list does not liberate energy when "burned" via nuclear fusion in the center of a star?
  - A. helium.
  - B. carbon.
  - C. iron.
  - D. silicon.
  - E. neon.
  
5. The Chandrasekhar limit tells us that
  - A. accretion disks can grow hot through friction.
  - B. neutron stars of more than 3 solar masses are not stable.
  - C. white dwarfs must contain more than 1.4 solar masses.
  - D. not all stars will end up as white dwarfs.
  - E. stars with a mass less than 0.5 solar masses will not go through helium flash.
  
6. A Type II supernova explosion occurs when a star
  - A. exhausts its supply of hydrogen fuel.
  - B. finishes its main-sequence phase of life.
  - C. becomes a white dwarf.
  - D. attempts to burn iron in its iron core.
  - E. produces a planetary nebula.
  
7. Which of the following is true of pulsars?
  - A. They have very strong magnetic fields.
  - B. They rotate very rapidly.
  - C. They are neutron stars.
  - D. They have a density approximately equal to the density of an atomic nucleus.
  - E. All of the above are true.
  
8. The density of a \_\_\_\_\_ is greater than the density of a \_\_\_\_\_.
  - A. white dwarf; neutron star
  - B. neutron star; black hole
  - C. pulsar; neutron star
  - D. pulsar; white dwarf
  - E. white dwarf; black hole
  
9. Which of the following can escape from inside the event horizon of a black hole?
  - A. particles of matter.
  - B. particles of antimatter.
  - C. visible light.
  - D. X-rays.
  - E. None of the above.
  
10. Which of the following statements about our Milky Way Galaxy is incorrect?
  - A. It is a spiral galaxy.
  - B. It consists of both a disk and a halo of stars.
  - C. The Sun is at a distance of about 25,000 light years from the galactic center.
  - D. New stars are being formed from the gas in the disk.
  - E. none of the above.
  
11. Harlow Shapley found the center of the Milky Way lies in the direction of the constellation Sagittarius based on observations of the positions of
  - A. spiral nebulae.
  - B. bright stars.
  - C. asteroids.
  - D. planetary nebulae.
  - E. globular clusters.

12. Images of star clusters sometimes show a blue haze surrounding the stars. What causes this "haze"?
- A. bending of light by dark, massive objects in the cluster
  - B. ultraviolet emission by ionized hydrogen
  - C. scattering of light by dust particles
  - D. it is a problem caused by poor optics in the telescopes
  - E. intense magnetic fields which make electrons move in relativistic spiral patterns
13. Young star clusters
- A. are found in the halo of our galaxy.
  - B. only form in the bulge of the galaxy.
  - C. form mostly in the gaseous disk of the Galaxy.
  - D. are found only in elliptical galaxies.
  - E. contain only metal poor stars.
14. Which of the following is a characteristic of the halo component of the Milky Way?
- A. circular stellar orbits
  - B. randomly inclined stellar orbits
  - C. high metal abundance
  - D. young stars
  - E. active star formation regions
15. Younger stars have more heavy elements because
- A. old stars destroy heavy elements as they age.
  - B. young stars burn their nuclear fuels faster.
  - C. heavy elements were made in previous generations of stars.
  - D. all of these
  - E. heavy elements haven't had time to settle to the core of these younger stars.

Key for quiz4<sub>c</sub>

1. C
2. D
3. B
4. C
5. D
6. D
7. E
8. D
9. E
10. E
11. E
12. C
13. C
14. B
15. C