

Final Astronomy 101 Winter 2006

1. The exam should take ~2 hours to complete.
2. There are 100 multiple choice questions.
3. Choose the one alternative that best completes the statement or answers the question.
4. If you leave the classroom during the exam, you cannot return!
5. When you are done, please leave the room quietly!
6. If you have a question, please raise your hand.
7. Have a great vacation!!!!



Pick the answer that best describes the *approximate* size of the following objects:

1. The radius of the Milky Way
A. 1 pc B. 10 kpc C. 1 Mpc
2. The distance to the nearest star
A. 1 pc B. 10 kpc C. 1 Mpc
3. The distance to a galaxy that is receding from us with a speed of 7500 km/s
A. B. 1 kpc C. 10 kpc D. 100 Mpc
4. The mass of the Milky Way
A. $1 M_{\odot}$ B. $10 M_{\odot}$ C. $10^6 M_{\odot}$ D. $10^{12} M_{\odot}$
5. The mass of a main sequence O-star
A. $1 M_{\odot}$ B. $10 M_{\odot}$ C. $10^6 M_{\odot}$ D. $10^{12} M_{\odot}$
6. The rotation speed of the Milky Way
A. 20 km/s B. 200 km/s C. 2000 km/s
7. The interval between observations used to measure the parallax of nearby stars.
A. 1 yr B. 10^6 yr C. 10^{10} yr
8. The lifetime of an $0.1 M_{\odot}$ star.
A. 1 yr B. 10^6 yr C. 10^{10} yr
9. The wavelength of the light emitted by a laser pointer
A. 5 nm B. 50 nm C. 500 nm D. 5000 nm

10. The force of gravity is an inverse square law. This means that, if you *double* the distance between two massive objects, the gravitational force between them
- A. strengthens by a factor of 4.
 - B. is unaffected.
 - C. weakens by a factor of 4.
 - D. also doubles.
 - E. weakens by a factor of 2.
11. The ultimate source of energy that *powers* the Sun is
- A. kinetic energy of the rotation of the Sun.
 - B. chemical potential energy of hydrogen burning into helium.
 - C. gravitational potential energy of the contraction of the gas cloud that formed the Sun.
 - D. mass energy of hydrogen fusing into helium.
 - E. thermal energy of the high temperature hydrogen atoms in the Sun.
12. Which of the following statements about electrons is *not* true?
- A. An electron has a negative electrical charge.
 - B. Within an atom, an electron can have only particular energies.
 - C. Electrons are never found outside of atoms
 - D. Electrons can jump between energy levels in an atom only if they receive or give up an amount of energy equal to the difference in energy between the energy levels.
 - E. Electrons have very little mass compared to protons or neutrons.
13. Each of the following describes an "Atom 1" and an "Atom 2." In which case are the two atoms different *isotopes* of the same element?
- A. Atom 1: nucleus with 8 protons and 8 neutrons, surrounded by 8 electrons.
Atom 2: nucleus with 8 protons and 8 neutrons, surrounded by 7 electrons.
 - B. Atom 1: nucleus with 4 protons and 5 neutrons, surrounded by 4 electrons.
Atom 2: nucleus with 5 protons and 5 neutrons, surrounded by 4 electrons.
 - C. Atom 1: nucleus with 7 protons and 8 neutrons, surrounded by 7 electrons.
Atom 2: nucleus with 7 protons and 7 neutrons, surrounded by 7 electrons.
 - D. Atom 1: nucleus with 6 protons and 8 neutrons, surrounded by 6 electrons.
Atom 2: nucleus with 7 protons and 8 neutrons, surrounded by 7 electrons.