Sample ASTR100 Final Exam Questions (Fall 2024)

Solutions available at the end of this document, but no **peeking**! Try to do these questions without the book or the internet, and without looking at the solutions. for the most realistic exam experience.

Multiple Choice Questions

1. The cosmic background radiation is now considered to be
   A. the remains of the original Big Bang creation radiation.
   B. evidence for cool gas between the galaxies.
   C. radiation from the most distant galaxies not yet seen.
   D. radiation from the dust in galaxies.
   E. almost the same as it was 10 billion years ago.

2. Which of the following is a consequence of the Hubble Law?
   A. All galaxies are moving away from us equally fast.
   B. The more distant a galaxy is from us, the faster it moves away from us.
   C. The closer a galaxy is to us, the faster it moves away from us.
   D. Jets of material moving toward us appear blue shifted.
   E. More distant galaxies appear younger.

3. What kinds of atomic nuclei formed during the Era of Nucleosynthesis?
   A. Only hydrogen.
   B. Only helium.
   C. Hydrogen and helium and trace amounts of lithium, beryllium, and boron.
   D. Nuclei of all the elements.
   E. Hydrogen, helium, boron, and iron.

4. Seyfert galaxies are
   A. the largest galaxies in the universe.
   B. irregular galaxies visible from the Southern Hemisphere.
   C. very small elliptical galaxies.
   D. the most distant galaxies in the universe.
   E. spiral galaxies with unusually bright nuclei.

5. The Sun supports itself against collapsing under its own gravity by
   A. Having a strong, solid iron core
   B. Radiation pressure
   C. Strong magnetic fields
   D. Fusion of helium nuclei into hydrogen
   E. Fusion of hydrogen nuclei into helium

6. Name 4 of the largest 10 moons (or natural satellites) in the Solar System and the planet that they orbit.

7. Use the formula $v = H d$ (here v=velocity, H = Hubble's constant, d= distance) to show that galaxies were all on top of one another at a single point in the past. Consider two galaxies, one a distance d_1 away from us moving at v_1 and one a distance of d_2 away from us moving at v_2. Solve for the times t_1 and t_2 that each galaxy was on top of our galaxy and show that the two times are equal. You will also need the equation $d = v t$.

Sample Final Exam Answers

1. A

2. B

3. C

4. E

5. B

6. Here are 7 of the most famous big moons
   Jupiter's Galilean Satellites: Io, Europa, Ganymede, Callisto
   Saturn's Titan
   Earth's Moon
   Neptune's Triton

7. Write the equation twice, one for galaxy 1 and once for galaxy 2:
$d_1 = v_1 t_1$ and $d_2 = v_2 t_2$.
Solve for t: $t_1 = d_1/v_1$ and $t_2 = d_2/v_2$.
Use Hubble's Law to replace d/v: $t_1 = H$ and $t_2 = H$.
So $t_1 = t_2$.
Hubble's law predicts that all galaxies were at the same point in space at the same time in the past.
A linear relationship between d and v is the only equation that has this property!