

## QUIZ #8

1. The resolution of Olbers' paradox is that the dark night sky tells us that
  - a) **the Universe cannot be infinite in both space and time.**
  - b) the Universe must contain large amounts of absorbing material.
  - c) the Universe has always been here.
  - d) we are located near one edge of the Universe.
  
2. The Cosmological Principle says that
  - a) **the overall properties of the Universe look the same as seen from anywhere.**
  - b) the overall properties of the Universe always look the same.
  - c) our location must be nearly central in the Universe.
  - d) explanations should be as simple as possible while fitting the facts.
  
3. The "Big Bang" happened
  - a) centered near the Milky Way's present location.
  - b) centered on the Virgo Supercluster.
  - c) in the middle of today's Bootes galaxy void.
  - d) **everywhere.**
  
4. The cosmic microwave background radiation originated when
  - a) the first stars formed.
  - b) atomic nuclei were first stable.
  - c) **the Universe first became transparent.**
  - d) Matter and antimatter were last in balance.
  
5. Processes in the early Universe were responsible for the relative amounts of
  - a) **hydrogen, deuterium, and helium.**
  - b) carbon, nitrogen, and oxygen.
  - c) radioactive elements.
  - d) ionized and neutral gas.
  
6. The age of the Universe derived from its expansion is most nearly
  - a) 10 million years.
  - b) one billion years.
  - c) **15 billion years.**
  - d) one trillion years.
  
7. Some properties of the Universe are explained if the early Universe underwent
  - a) **a brief period of exponentially accelerated expansion.**
  - b) a series of cycles of expansion and contraction
  - c) a long period of static form followed by rapid expansion,
  - d) the massive production of black holes.
  
8. Recent observations of supernovae show that the expansion of the Universe is
  - a) going on at a constant rate.
  - b) slowing down as a result of the gravity of everything in it.
  - c) **accelerating for some unknown reason.**
  - d) cycling over time between positive and negative rates.

(OVER)

9. Which is the chronological order of the following becoming stable in the early Universe?

**a) protons and neutrons, atomic nuclei, neutral atoms, stars.**

b) atomic nuclei, protons and neutrons, neutral atoms, stars

c) stars, neutral atoms, atomic nuclei, protons and neutrons

d) atomic nuclei, stars, neutral atoms, protons and neutrons

10. What we see now as the cosmic microwave background originated

a) when atomic nuclei were formed.

b) from the first generation of stars.

**c) when the Universe became transparent.**

d) during the epoch of cosmological inflation.