

## Introductory Astronomy

**Homework 31: Cosmology** Not to be handed in. Homework solutions are posted already.

- The science of the universe as a whole is called:
  - proctology.
  - universology.
  - cosmetology.
  - inflation.
  - cosmology.
- The big bang is:
  - the explosion of a supernova.
  - the explosion of a star.
  - a theoretical origin of the observable universe.
  - the explosion of a quasar.
  - a theoretical end of the observable universe.
- Given  $v$  as expansion velocity and  $d$  as distance, Hubble's law is:
  - $d = Hv$ .
  - $d = H/v$ .
  - $v = Hd$ .
  - $v = H/d$ .
  - $v = Hd^2$ .
- "Let's play *Jeopardy!* For \$100, the answer is: He/she is the observational discoverer of Hubble's law." Who is \_\_\_\_\_, Alex?
  - Henrietta Swan Leavitt (1868–1921)
  - Knut Lundmark (1889–1958)
  - Edwin Hubble (1889–1953)
  - Georges Lemaître (1894–1966)
  - Adriaan van Maanen (1884–1946)
- The current value of the Hubble time and the concordance model value for the age of the universe are both about:
  - 14 Gyr.
  - $10^{100}$  yr.
  - 10 years.
  - 4.6 Gyr.
  - 0.
- The Hubble distance with current value of 4200 Mpc defines the characteristic size scale of the:
  - quantum of the inflaton.
  - Galaxy.
  - total universe.
  - observable universe.
  - solar system.
- According to observations of several kinds beginning in 1998, it seems that the universal expansion is currently:
  - decelerating.
  - stopped.
  - negative: i.e., the universe is contracting.
  - in doubt.
  - accelerating.
- After the dark energy (whatever that is) the most abundant form of energy in the universe is apparently some form of matter known only through its gravitational effects. We call this matter the:
  - luminous matter.
  - dark matter.
  - squishy matter.
  - invisible matter.
  - mirror matter.
- In big bang nucleosynthesis, the major products were:
  - hydrogen and iron in about a 1:1 mass ratio.
  - hydrogen and helium in about a 3:1 mass ratio.
  - hydrogen and helium in about a 1:1 mass ratio.
  - hydrogen and iron in about a 3:1 mass ratio.
  - helium and iron in equal amounts by mass.
- Most of the heavy elements (those for carbon and up certainly) in the universe were formed in:

- a) stars and supernovae.      b) black holes.      c) the big bang.      d) nuclear reactors.  
e) planets.
11. The relic primordial electromagnetic radiation field from the early universe is usually called the:
- a) Cosmic Gamma-ray Background (CGB).      b) Cosmic X-ray Bare Ground (CXBG).  
c) Cosmic X-ray Foreground (CXF).      d) Cosmic Microwave Background (CMB).      e) Cosmic X-ray Background (CXB).
12. “Let’s play *Jeopardy!* For \$100, the answer is: It the concept that the early observable universe (and perhaps a good deal more) underwent a period of super-expansion.”  
What is \_\_\_\_\_, Alex?
- a) inoculation      b) infestation      c) hybridization      d) hydration      e) inflation
13. “Let’s play *Jeopardy!* For \$100, the answer is: This concept offers possible solutions to three problems of cosmology: the magnetic monopole, horizon, and flatness problems.”  
What is \_\_\_\_\_, Alex?
- a) the cosmological constant  $\Lambda$       b) the Einstein universe      c) big bang cosmology  
d) inflation      e) perdition