1. The traditional theory states that the Milky Way formed
   * a) as a large spherical cloud of gas that was rotating very slowly.
   b) from a large cloud of material that broke off a larger galaxy.
   c) from material that had been ejected in the violent explosion of a dying galaxy.
   d) as a result of mergers between several smaller groups of gas, dust, and stars.
   e) as two massive galaxies collided.

2. If \( H = 70 \text{ km/sec/Mpc} \), then a galaxy with a radial velocity of 2100 km/sec has a
distance of approximately
   a) 2170 Mpc
   b) 2030 Mpc
   * c) 30 Mpc
   d) 0.03 Mpc
   e) 147,000 Mpc

3. The energy from an AGN is produced by
   a) the collision of two spiral galaxies.
   b) the collision of two elliptical galaxies.
   c) the collision of two radio jets.
   * d) matter flowing into a supermassive black hole.
   e) supernovae.

4. The resolution of Olbers' paradox suggests that it gets dark at night because
   * a) the universe is not infinite in age.
   b) the universe is static.
   c) the universe is closed.
   d) a and b
   e) all of the above

5. The cosmic background radiation comes from a time in the evolution of the universe
   a) when protons and neutrons were first formed.
   b) when the big bang first began to expand.
   c) the inflationary period
   d) when gamma rays had enough energy to destroy nuclei
   * e) when electrons began to recombine with nuclei to form atoms.
6. Observational support for the Big Bang Theory rests on
   a) the observation that the redshift of galaxies becomes larger with larger distance
      from us
   b) the observation of primordial background radiation
   *   c) answers a and b
   d) there is no observational support for the Big Bang as of yet

7. Which of the following is NOT true
   *   a) during the first second after the Big Bang, the Universe was as hot as a trillion
       degrees and full of radio waves
   b) about four seconds after the big bang, the production of protons, neutrons, and
      electrons was complete
   c) thirty minutes after the Big Bang, nuclear reactions stopped and the matter of the
      Universe was composed of 75% H nuclei and 25% He nuclei
   d) about a 300,000 years after the Big Bang, the Universe cooled to about 3,000K,
      neutral atoms could form, and radiation (primordial radiation we can see today)
      was free to travel through the Universe
   e) within a billion years after the Big Bang, matter collected into the first galaxies
      and stars