

29:50 Stars, Galaxies, and the Universe

Instructor: Spangler

Homework Assignment # 9

November 2, 2010

Note: Corresponding quiz on ICON must be completed by 8AM, Monday, November 8

1. At one phase in its lifetime after the Main Sequence, a star like the Sun produces a luminous cloud consisting of the matter that was once the outer layers of the star. The name for this class of objects is
 - (a) planetary nebula
 - (b) supernova remnant
 - (c) Herbig-Haro object
 - (d) spiral galaxy
 - (e) supernova
2. What is the object that is the remnant of a supernova about 1000 years ago, and which contains a famous pulsar?
 - (a) 18 Scorpii
 - (b) M27, the Dumbbell Nebula
 - (c) M31, the Andromeda Nebula
 - (d) NGC 1342, an open star cluster
 - (e) M1, the Crab Nebula
3. The objects called HII regions are
 - (a) dark, cold regions in space between the stars
 - (b) glowing clouds of gas around hot, luminous stars
 - (c) white dwarf stars that have cooled to very low temperatures
 - (d) distant objects similar in mass and content to the Milky Way
 - (e) clouds of neutral hydrogen that will produce stars in the near future
4. In class and in the book, we discussed three main classes of binary stars. These are
 - (a) visual, eclipsing, and spectroscopic
 - (b) visual, gravitational, and radiational
 - (c) eclipsing, radiation-dominated, and electromagnetic
 - (d) giant, bright giant, and supergiant
 - (e) spectroscopic, neutronic, and Alfvénic
5. The astronomical search for black holes consists of finding an object with one of the following sets of characteristics. Which is it?

- (a) a binary star with a main sequence star and a red giant star possessing an apparent magnitude brighter than 5.0
 - (b) a binary star containing a nonluminous, nonstellar companion with a mass in excess of 3 solar masses
 - (c) a dark, roughly circular region of no light seen against a bright nebula such as the Orion Nebula
 - (d) a binary star containing a nonluminous, nonstellar companion with a mass less than 1.4 solar masses
 - (e) two solar-type stars surrounded by a cloud of intense radio emission
6. Physically, supernovas correspond to
- (a) the collapse of a core of a massive star.
 - (b) a flaring of an accretion disk around a white dwarf.
 - (c) gigantic versions of solar flares that occur on RS Canum Venaticorum stars.
 - (d) release of energy by the gravitational collapse of a star cluster.
 - (e) annihilation of matter and antimatter in the center of the Milky Way.
7. The reason that HII regions are seen around hot, bright stars is that
- (a) the gas comes in contact with the hot stellar surfaces and begins to glow
 - (b) the gas in the HII regions reflects the starlight and creates a halo around the star
 - (c) hot bright stars produces high energy proton radiation that ionizes the hydrogen
 - (d) such stars produce many photons that can ionize hydrogen
 - (e) these are the only places in the galaxy where there is gas as well as stars
8. An example of an HII region is
- (a) the open star cluster NGC 1342
 - (b) the Orion Nebula
 - (c) the Andromeda Nebula
 - (d) the globular star cluster M13
 - (e) M27, the dumbbell nebula