

ASTR1102-002

Practice Questions for Final Exam

1. The typical mass of a normal spiral galaxy is _____ (fill in the blank).
 - a. 1000 solar masses
 - b. 10^{-9} solar masses
 - c. 10^{11} solar masses
 - d. 10^{22} solar masses
2. How many stars are in a typical normal spiral galaxy?
 - a. 1000 stars
 - b. 10^{-9} stars
 - c. 10^{11} stars
 - d. 10^{22} stars
3. Most stars found in Elliptical galaxies are young, “Population I” stars. (True or False?)
4. Most catalogued galaxies are classified as “Irregular” galaxies. (True or False?)
5. Our Milky Way Galaxy is classified as a _____ galaxy. (Fill in the blank.)
 - a. Spiral
 - b. Elliptical
 - c. Dwarf Elliptical
 - d. S0
 - e. Irregular
6. The Large Magellanic Cloud is classified as a _____ galaxy. (Fill in the blank.)
 - a. Spiral
 - b. Elliptical
 - c. Dwarf Elliptical
 - d. S0
 - e. Irregular
7. Type II supernovae are usually found in Elliptical galaxies. (True or False?)
8. What is the approximate diameter of our Milky Way Galaxy?
 - a. 50 AU
 - b. 50 parsecs
 - c. 50 kpc
 - d. 50 Mpc
 - e. 50 (km/s)/Mpc
9. Compare “Population I” and “Population II” stars. Specifically, identify 3 characteristics that distinguish whether or not a star belongs to “Pop I” or “Pop II.”
10. The stars in the disk of our Milky Way Galaxy are predominantly “Population II” stars. (True or False?)

11. The Sun orbits the center of our Milky Way Galaxy in an approximately circular orbit whose radius is approximately _____. (Fill in the blank.)
 - a. 8 AU
 - b. 8 parsecs
 - c. 8 kpc
 - d. 8 Mpc
 - e. 8 (km/s)/Mpc
12. The stars in the globular clusters of our Milky Way Galaxy are predominantly “Population II” stars. (True or False?)
13. The Sun is a “Pop III” star. (True or False?)
14. The interstellar dust in our Galaxy lies primarily in the _____ of the Galaxy. (Fill in the blank.)
 - a. Disk
 - b. Airplane
 - c. Halo
 - d. Center
 - e. Globular Clusters
15. If you want to map out the distribution of hydrogen gas in our Galaxy, what type of telescope should you use?
 - a. The Hubble Space Telescope (HST)
 - b. The space-based, Infrared Spitzer Telescope
 - c. A ground-based radio telescope with a receiver sensitive to 21-cm radiation.
 - d. A space-based X-ray telescope
 - e. A ground-based micro-wave antenna
16. Explain why Type Ia supernovae are good “standard candles” to use when studying cosmology.
17. What “standard candle” did Shapley use to measure the distances to Globular Clusters in our Galaxy?
 - a. The Sun
 - b. “Pop I” stars
 - c. “Population I” Cepheid variable stars
 - d. RR Lyrae variable stars
 - e. Type Ia supernovae
18. Describe the difference between Herschel’s map of our Galaxy and Shapley’s map of our Galaxy. Explain how and why Shapley was able to obtain a more faithful representation of the size of our Galaxy and a more faithful representation of the Sun’s location in our Galaxy.
19. An RR Lyrae star with an apparent magnitude $m = +15$ has been found in a globular cluster. How far away from us is this globular cluster? Is this cluster in our Galaxy, or well outside of our Galaxy?
20. Why did Edwin Hubble use “Population I” Cepheid variable stars instead of “Population II” RR Lyrae stars to measure the distance to the Andromeda galaxy?
21. An astronomer discovers a variable star in our Galaxy that has a pulsation period of 20 days. Is this an RR Lyrae variable, or a Cepheid variable?
22. Generally speaking, “Pop I” stars are younger than “Pop II” stars. (True or False?)

23. Generally speaking, “Pop I” stars are more metal rich than “Pop II” stars. (True or False?)
24. Stars orbiting in the disk of the Andromeda galaxy are predominantly “Pop II” stars. (True or False?)
25. Generally speaking, “Pop I” stars are younger than “Pop II” stars. (True or False?)
26. By carefully studying the motions of various stars near the center of our Galaxy, astronomers have determined that these stars are orbiting a _____ that is located at the center of our Galaxy. (Fill in the blank.)
 - a. Large globular cluster
 - b. Large open cluster
 - c. Massive pulsar
 - d. Supermassive black hole
 - e. Dwarf elliptical galaxy
27. The universe contains approximately 10 million galaxies. (True or False?)
28. Edwin Hubble discovered that the universe is expanding by measuring the proper motions of numerous nearby galaxies. (True or False?)
29. Edwin Hubble discovered that the universe is expanding by measuring the radial velocities of numerous nearby galaxies. (True or False?)
30. Hubble discovered that approximately half of all galaxies in our region of the universe are moving toward us and approximately half are moving away from us. (True or False?)
31. Hubble discovered that virtually all galaxies in our region of the universe are moving toward us. (True or False?)
32. Hubble discovered that virtually all galaxies in our region of the universe are moving away us. (True or False?)
33. The slope of the “best fit” line through the data in Hubble’s velocity versus distance diagram is $H_0 = 73 \text{ (km/s)/Mpc}$. What property of the universe is revealed by the measured slope of this line?
34. A galaxy in Cluster “A” has a measured radial velocity of 10,000 km/s while a galaxy in Cluster “B” has a measured radial velocity of 61,000 km/s. According to the Hubble Law, which cluster of galaxies is farther from us?
35. How were the distances determined to all of the galaxies in the so-called “2dF” galaxy survey? (See the textbook discussion associated with figure 24-24a.)
36. According to the Hubble Law diagram, what is the approximate age of the universe?
 - a. 73 km/s
 - b. 73 Mpc
 - c. 13.4 billion years
 - d. 4 billion parsecs
 - e. 6000 years
37. The surface of an expanding balloon serves as a good analogy for our expanding universe if our universe _____. (Fill in the blank.)
 - a. Is geometrically flat
 - b. Has positive curvature
 - c. Has negative curvature

38. The surface of an expanding balloon serves as a good analogy for our expanding universe if our universe _____. (Fill in the blank.)
- Is flat
 - Is open
 - Is closed
39. Explain what we can learn about the universe by measuring the density parameter, Ω_0 ?
40. Explain how the discovery of “Cosmic Microwave Background” (CMB) radiation by Penzias and Wilson provided very strong support for the “Big Bang” theory of the origin of the universe.
41. At the time of recombination in the early universe, what was the radiation temperature of the universe? (See Figure 1.)
42. At the present time, what is the measured radiation temperature of the universe?
43. If you want to measure the present radiation temperature of the universe, what type of telescope should you use?
- The Hubble Space Telescope (HST)
 - The space-based, Infrared Spitzer Telescope
 - A ground-based radio telescope with a receiver sensitive to 21-cm radiation.
 - A space-based X-ray telescope
 - A ground-based and/or space-based micro-wave antenna
44. What features of the present-day universe developed from the very low amplitude non-uniformities that are seen in WMAP’s all-sky map of the CMB radiation?
- Hydrogen atoms
 - Helium nuclei
 - Carbon nuclei
 - Galaxies
 - Sunspots
45. What was the radiation temperature of the universe when primordial helium was synthesized? (See Figure 2.)
46. Approximately how old was the universe when primordial helium was synthesized?

Figure 1

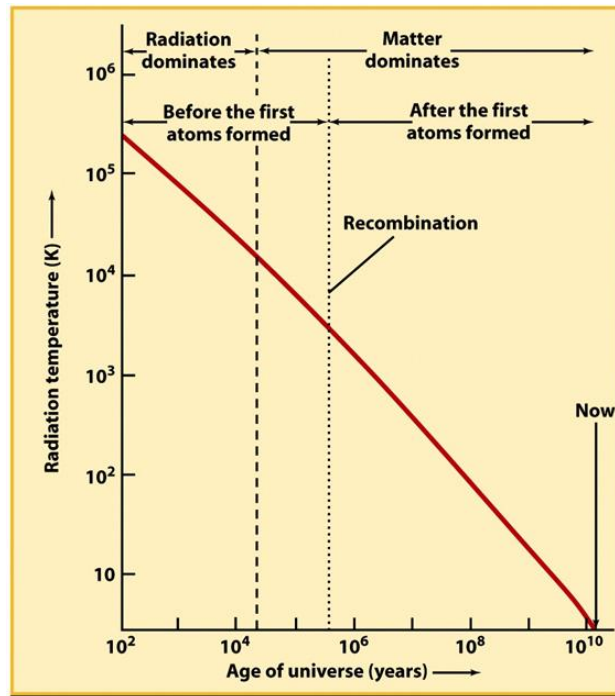


Figure 2

