

Physics 1061. Stars and Galaxies

Final Exam, Ch 24,26 REVIEW.

(See previous Reviews for Ch. 23 Quiz, along with the previous exam review questions.)

Galaxies and Distances

- Which of the following is NOT one of the Hubble types of galaxy?
(a) spiral (b) lenticular/S0 (c) globular (d) irregular (e) elliptical
- Which type of galaxy has the highest percentage of Population II stars?
(a) normal spiral (b) barred spiral (c) globular (d) irregular (e) elliptical
- What Hubble type is the Milky Way galaxy?
(a) Irr I (b) E2 (c) E6b (d) SBb/c (e) SAd
- Which type of galaxy can grow to the greatest mass and possess the largest number of globular clusters?
(a) normal spiral (b) barred spiral (c) globular (d) irregular (e) elliptical
- T or F. The subtype that we assign to ellipticals (e.g., E2 or E6) depends on their orientation in space.
- T or F. The mixture of stars in ellipticals is basically the same as in spirals and irregulars.
- Which *two* of the following is not a criterion for classifying spiral galaxies between Sa and Sd?
(a) bulge to disk ratio (b) clumpiness of arms (c) distance to galaxy (d) tightness of winding of arms (e) inclination angle
- Most spiral galaxies have a rotation velocity that stays nearly constant with radius rather than decreasing. This indicates the presence of
(a) globular clusters (b) dark matter (c) enhanced star formation (d) isotropy
(e) Keplerian orbits
- Why are Cepheid variable stars so important in cosmology?
(a) They are abundant in the solar neighborhood.
(b) They can be used to find galaxy distances out to ~ 25 Mpc.
(c) They have an easily identifiable spectrum.
(d) They are the oldest stars known.
(e) They are brighter than RR Lyrae stars.
- When we know the apparent (or “relative”) magnitude of an object, all that we need to calculate its distance is _____.

- (a) its diameter (b) its absolute magnitude (c) its radius (d) its m_v
 (e) its velocity
11. Most of the galaxies ($> 99\%$) are
- (a) moving around randomly.
 - (b) showing Doppler blueshifts.
 - (c) moving in circles.
 - (d) rushing away from us.
 - (e) approaching us.
12. Galaxy distance and Doppler redshift are correlated for galaxies. What do we call that correlation?
- (a) the Hubble law
 - (b) Wein's law
 - (c) Kirchoff's law
 - (d) the period luminosity relation
 - (e) Einstein's postulate of special relativity
13. One redshift-independent distance estimator which works for galaxies beyond 30 Mpc is _____.
- (a) Cepheid stars (b) spectroscopic parallax (c) the Tully-Fisher relation
 - (d) stellar parallax (e) the Hubble Law
14. (3pts) Order these distance estimators by their height on the "distance ladder". Here, "1" will be the estimator for the lowest rung (limited to the shortest distances).
- | | |
|------------------------------|--------------------------|
| _____ Hubble's Law | _____ Radar |
| _____ Stellar Parallax | _____ Tully-Fischer |
| _____ Cepheids | _____ Type Ia Supernovae |
| _____ Spectroscopic Parallax | |
15. That some spirals have unusually luminous nuclei was discovered by:
- (a) Vesto Slipher.
 - (b) Edwin Hubble.
 - (c) Walter Baade.
 - (d) Carl Seyfert.
 - (e) Heber Curtiss.
16. If we are directly in the line of a jet coming out of the lobe galaxy's core, we see a:
- (a) hypernovae.

- (b) pulsar.
 - (c) quasar.
 - (d) blazar.
 - (e) magnetar.
17. Quasar's spectral lines are:
- (a) emission lines with large red shifts.
 - (b) a continuum from the synchrotron radiation.
 - (c) fuzzy absorption lines from the merged light of the billions of stars.
 - (d) too complex for any interpretation.
 - (e) nonexistent, the gas so hot as to be totally ionized, so no lines are seen.
18. Why are quasars called "quasi-stellar"?
- (a) Their spectra strongly resemble the spectra of stars.
 - (b) They are ordinary stars located at vast distances from Earth.
 - (c) They look like stars on early photographs.
 - (d) Like the stars visible in our night sky, quasars reside within the boundaries of the Milky Way.
 - (e) They are all strong radio as well as visible light sources.
19. Which of these would NOT be typical of an active galactic nucleus.
- (a) High luminosities, peaking in the visible range.
 - (b) Most of their energy is non-stellar, and not related to stellar fusion processes.
 - (c) Broad emission lines suggest very high speeds near the source.
 - (d) Highly variable output suggests a compact source.
 - (e) Often show bipolar jets coming out from the source.
20. What is the most likely source of energy for all active galactic nuclei?
- (a) collisions of large spiral galaxies
 - (b) large clusters of very massive, luminous stars
 - (c) a single supermassive, superluminous star
 - (d) accretion onto a supermassive black hole
 - (e) numerous supernovae from rapid star formation in young galaxies

Cosmology

21. T or F. The motion of galaxies away from us proves that we are at the center of the universe.

22. The beginning of our observable universe is referred to as the _____.
23. Observations of Type Ia supernovae indicate that our universe is _____ in its expansion.
24. Our current best estimate of the age of the universe is
- (a) 10-20 million years (b) 4.5-5 billion years (c) 12-15 billion years
 - (d) 100-200 billion years (e) infinite.
25. The critical evidence for cosmic acceleration in 1998 came from two teams of astronomers, both observing:
- (a) hypernovae.
 - (b) gamma ray bursts.
 - (c) type Ia supernovae.
 - (d) type II supernovae.
 - (e) ages of globular clusters.
26. What is the meaning of isotropic?
- (a) the same density everywhere
 - (b) the same in all directions
 - (c) the same at all times
 - (d) the same temperature everywhere
 - (e) the same in every way throughout space
27. _____ is the concept that all large samples of the universe are alike in appearance anywhere in the universe.
- (a) Conformity
 - (b) Isotropy
 - (c) Universality
 - (d) Homogeneity
 - (e) Cosmology
28. The idea that the universe looks the same no matter where you are, is called the
- (a) cosmological principle (b) law of gravitation (c) cosmic quota
 - (d) anthropic principle (e) Kansas principle
29. The temperature of the Cosmic Microwave Background is now
- (a) 2 K (b) 2.7 K (c) 100 K (d) 5800 K (e) 1,000,000 K

30. The age of the universe is
- (a) 10 -20 million years (b) 4.5-5 billion years (c) 100-200 billion years
 - (d) 10-20 billion years (e) infinite.
31. Olber found it paradoxical that the sky was _____.
32. Olber's paradox is only a problem if one assumes that the universe was all of the following except
- (a) homogeneous (b) isotropic (c) infinitely old (d) anthropic
 - (e) infinitely large
33. T or F. The observable universe is finite while the universe may be infinite.
34. T or F. Astronomers think dark energy has a slowing influence on the expansion of the universe while gravity increases the expansion rate.
35. T or F. Olber's paradox asks, "Why is the night sky dark?"
36. The Drake Equation is a way to estimate the number of intelligent civilizations in the _____.
- (a) sea (b) solar system (c) local group (d) observable universe
 - (e) Milky Way
37. The object referred to by the textbook as the largest structure known is the Sloan Great Wall, with a length of about _____.
- (a) 3000 Mpc (b) 300 Mpc (c) 14 GLY (d) 100 Mpc (e) 100 kpc
38. What is the meaning of a "closed" universe?
- (a) The universe will expand forever.
 - (b) The universe will someday stop expanding and start to collapse.
 - (c) The universe will stop expanding in an infinite amount of time.
 - (d) The universe is in a steady-state.
 - (e) The universe will disappear into a white hole in time.
39. The cosmic microwave background is important mostly because:
- (a) its detection lead to the discovery of dark energy.
 - (b) its detection opened a new form of radiation to observation.
 - (c) it confirmed a major prediction made by the Big Bang theory.
 - (d) it showed that the universe is open.
 - (e) it showed that the universe is closed.

- (d) the cosmic microwave background (e) the HR Diagram