

SAMPLE TEST 4 QUESTIONS
Physics 2022

1. How do we know that pulsars are not rotating white dwarfs?
 - a. a white dwarf would break up if it rotated as fast as a pulsar
 - b. there is only one rate at which white dwarfs can rotate
 - c. white dwarf stars cannot rotate
 - d. there are not enough white dwarfs to account for the number of known pulsars
 - e. white dwarfs do not have magnetic fields

2. Which of the following can you never know about a black hole?
 - a. the type of material inside it
 - b. its net electric charge
 - c. its location
 - d. its angular momentum
 - e. the total amount of mass inside it

3. The words “Schwarzschild radius” refer to
 - a. half the diameter of the gravitational pull of the black hole
 - b. half the diameter of the singularity in a black hole
 - c. the distance from the center of a black hole to the point at which the escape velocity becomes equal to the speed of light
 - d. the distance to which gas is ejected in a planetary nebula
 - e. half the diameter of a neutron star

4. Variable stars, such as Cepheid variables and RR Lyrae stars, are used in what important measurement in astronomy?
 - a. rotation speeds of galaxies
 - b. mass determinations
 - c. surface temperature measurement
 - d. the keeping of accurate time
 - e. distance measurement

5. What explanation does General Relativity provide for gravity?
 - a. Gravity is directly proportional to mass
 - b. Gravity is inversely proportional to mass
 - c. Gravity is a result of curved space-time
 - d. Gravity and anti-gravity are produced by gravitons
 - e. General Relativity describes light – not gravity

6. The famous Curtis-Shapley debate in 1920 concerned which fundamental astronomical question in astronomy?
- whether all stars were like the Sun, or fundamentally different
 - whether the Sun was at the center of the Milky Way Galaxy
 - whether the spiral “nebulae” were part of the Milky Way Galaxy or more distant, separate entities
 - whether black holes existed
 - whether the Universe was expanding outward in all directions
7. The type or group of galaxies which contains both the largest and smallest galaxies in the Universe is
- barred spirals
 - irregulars
 - Sc type galaxies
 - Seyfert galaxies
 - ellipticals
8. “Standard candles,” which are important for finding distances to remote galaxies, are
- standard laboratory light sources with which the brightness of a galaxy can be compared
 - standard bars of known length with which the size of a galaxy can be measured
 - heat sources used for calibrating infrared observations of galaxies
 - stars and other objects of known intrinsic brightness
 - artificial stars produced by shining lasers in the Earth’s atmosphere
9. The Hubble classification for a very elongated elliptical galaxy is
- SBc
 - Sc
 - S0
 - E0
 - E7
10. Compute the distance to a galaxy that has a $v = 3,000$ km/s. Use a Hubble constant = 70 km/s/Mpc.
- 4.3 Mpc
 - 43 Mpc
 - 430 Mpc
 - 4,300 Mpc
 - 43,000 Mpc

ANSWERS

1. a

2. a

3. c

4. e

5. c

6. c

7. e

8. d

9. e

10. b $d = v / H_0 = (3,000 \text{ km/s}) / 70 \text{ km/s/Mpc} = 43 \text{ Mpc}$