

Name: _____ Date: _____

1. A particular star in a binary star system orbits the other in an elliptical orbit with a semimajor axis of 3 AU and a period of 5 years. What is the sum of the masses of the two stars in the system?
 - A) 0.9 M_{\odot}
 - B) 1.1 M_{\odot}
 - C) 13.9 M_{\odot}
 - D) 0.07 M_{\odot}

2. The point around which two stars of unequal mass in a binary system appear to revolve is
 - A) closest to the more massive star.
 - B) halfway between the two star centers.
 - C) at the center of the more massive star.
 - D) closest to the less massive star.

3. Absorption lines in the spectra of some binary stars are seen to change periodically from single to double lines and back again. Why is this?
 - A) Oscillations on the surfaces of the stars leads to Doppler-shifted lines.
 - B) Periodically, the magnetic field of one star produces Zeeman splitting of spectral lines in atoms of the second star.
 - C) The effect of the gravitational field of one star on the atoms of the second star produces spectral line shifts periodically.
 - D) Motion toward and away from Earth during their orbital motion results in Doppler shift of light from these stars at times and no shift when the stars are moving perpendicular to the line of sight.

4. What condition is necessary for us to see eclipses of stars in binary star systems?
 - A) One of the stars must be much bigger than the other so that it can hide its smaller companion when the orbital plane is at a large angle to the line of sight.
 - B) The stars must have very similar surface temperatures whatever the inclination of their orbital plane to the line of sight, for us to see a significant eclipse.
 - C) The line of sight from Earth to the star system must be in or very close to the orbital plane of the stars.
 - D) The line of sight from Earth to the star system must be very close to the perpendicular to the orbital plane of the stars.

5. Suppose a Cepheid variable has been identified by its spectrum as a Type I Cepheid, and its period of brightness variability is measured to be 30 days. Its apparent magnitude is +23.3. How far away is it? The Sun's apparent magnitude is -26.7.
- A) 3.1×10^4 pc
 - B) 4.8×10^6 pc
 - C) 6.0×10^7 pc
 - D) 8.7×10^9 pc
6. When a star's evolutionary track on the Hertzsprung-Russell diagram carries it into the instability strip, what happens to the star?
- A) It collapses and forms a black hole.
 - B) It pulsates randomly in brightness.
 - C) It pulsates regularly in brightness.
 - D) It explodes.
7. What are the main general features that make clusters of stars useful to astronomers?
- A) The stars are at the same distance from Earth, were formed at approximately the same time, and were made from same chemical mix.
 - B) The stars are all at the same distance from Earth, have the same surface temperature, and joined the cluster at various times.
 - C) The stars all have the same apparent magnitude, the same surface temperatures, and the same sizes.
 - D) The stars all have the same intrinsic brightness but differ in size and surface temperature.
8. Within a globular cluster, what would you expect to find in the population of stars?
- A) a full range of stars from bright blue to dim red, with no bright red giant stars but significant amounts of dust and gas
 - B) a full mixture of bright blue supergiant and red giant stars, in addition to white dwarfs and dim red stars
 - C) mainly white dwarf stars surrounded by the remnant dust and gas from the planetary nebular stages of dying stars but no faint red stars, red giants, or bright blue stars
 - D) many red giants, white dwarfs, and dim red stars but no bright blue stars or dust and gas
9. The age of a cluster can be found by
- A) observing its position in the sky with respect to the Sun.
 - B) measuring its speed of motion relative to the Sun.
 - C) carrying out a number count of the stars in the cluster.
 - D) determining the turnoff point on the main sequence of its HR diagram.