

# ASTR 1 Practice Midterm #1 Exam

Note: This practice exam is about a third the length of the actual midterm #1 exam

1. Which of the following statements is true?

- Ultra-violet photons carry higher energy than infra-red photons.
- Ultra-violet photons have longer wavelengths than infra-red photons.
- Ultra-violet photons are invisible to human eye but infra-red photons are visible.
- Electromagnetic radiation exhibit wave-particle duality in the ultra-violet, but not in the infra-red.

2. A star has a right ascension of 6 hours (90 degrees). During which season of the year in the northern hemisphere is it observed to be overhead at noon?

- Summer
- Winter
- Spring
- Fall

3. Which of the following are associated with the Special Theory of Relativity?

- The bending of light by gravity
- The identical motion of all objects in a given gravitational field, irrespective of their mass
- The equivalence between gravity and an accelerated frame of reference
- Quantitative explanation of the perihelion precession of the planet Mercury
- None of the above


4. Solar eclipses can only occur during \_\_\_\_\_ Moon.

- The full
- Any phase of the
- The waning gibbous phase of the
- The waxing gibbous phase of the
- The new

5. The first quarter Moon is at the zenith. What time of day is it?


 Sunrise


 Midnight

 Sunset

 Noon

6. A celestial body at declination  $-50^\circ$  cannot be observed at

 South Pole

 Equator


 North Pole


 Zenith

7. Which of the following description about electrons is false?


 Energies of electrons within an atom are quantized.


 Electrons carry negative charge.


 When an electron within an atom absorbs a photon, it may jump to a higher energy level or escape from the atom.


 Electrons of opposite charges attract each other.

8. Escape velocity is higher on Sun surface than on Earth surface because \_\_\_\_\_

 The sun has a larger mass and radius.

 The sun has a higher mass to radius ratio.

 The sun is a star and Earth is a planet orbiting around it.

 General Relativity effect is more important on Sun surface.

9. Which constellation cannot be seen on the day of Halloween, at midnight in Santa Cruz?





 Taurus

 Gemini





 Scorpius

 Aries





10. Wizard Romney and Obama are twins and they use identical broomsticks. Initially they are at rest relative to each other. If Obama flies at 100,000 km/s away from Romney, which of the following statements is true?

-  Obama will measure Romney's broomstick to be longer than his.
-  Light travels from Romney to Obama at a speed 200,000 km/s.
-  After many years, Obama will see Romney age faster than him.
-  Broad emission lines are found in quasar spectra.





11. A Martian solar day has about 24 hours. If a Martian sidereal day is two minutes shorter than a Martian solar day, which of the following is false?

-  Mars spins on its own axis and orbits around the sun in the same sense.
-  A Martian year is about twice as long as an Earth year.
-  A Martian year is about four times as long as an Earth year.
-  The orbital eccentricity of Mars is larger than that of the Earth.

12. Pluto and its satellite Charon are mutually tidally locked. That implies

-  The rotation period of Charon about its own axis is same as that of Pluto.
-  On Charon, Pluto stays at the same position in sky; on Pluto, Charon rises and sets.
-  Pluto and Charon spin in different sense (one clockwise and one counterclockwise).
-  Pluto does not sweep out equal areas of its orbit around the Sun in equal times, violating Kepler's law of planetary motion.

13. Venus's orbit is smaller than the Earth's orbit. Which of the following is false?

-  Venus appears in the sky always near sunrise or sunset, i.e. Venus's position is always close to the sun.
-  When Venus is closest to Earth, its phase as seen on Earth is full.
-  Venus goes through all possible phases: new, crescent, gibbous full.
-  When the phase of Venus is full, its size in the sky is smallest.

14. There are four solid balls of the same size. The ball made of \_\_\_\_\_ has the smallest Schwarzschild radius.

-  Iron
-  Cotton
-  Gold
-  Pumpkin