

## Physics 1305 Exam 1 Sample Questions

For all questions there may be more than one correct answer to each question or there may be NO correct answers. Mark all correct answers on the answer sheet. You will be graded RIGHT MINUS WRONG, answer by answer, not question by question! (i.e., You will receive one point for each correct answer marked and have one subtracted from your score for each incorrect answer marked. You will receive neither penalty nor bonus for any answer left blank.) DO NOT GUESS!!!!

- 1.) The star alpha crucis has a right ascension of 12h24m and a declination of  $-60$  degrees 08 minutes, while beta crucis has a right ascension of 12h45m and a declination of  $-59$  degrees 24 minutes. Which of the following are true?
  - A) Alpha crucis will be on the meridian 21 minutes after beta crucis will.
  - B) If for a particular observer, beta crucis has an altitude on the meridian of 90 degrees, the altitude on the meridian of alpha crucis will be 89 degrees 16 minutes.
  - C) An observer at a latitude of  $+20$  degrees will be able to observe alpha crucis.
  - D) Beta crucis will be circumpolar for an observer at a latitude of 0 degrees.
  
- 2.) During a full moon:
  - A) A lunar eclipse may be possible.
  - B) A solar eclipse may be possible.
  - C) Tides will be stronger than normal.
  - D) Tides will be weaker than normal.
  
- 3.) On a particular night, a star is observed to cross the meridian at a local sidereal time of 7h23m, and a central standard time (CST) of 22h46m. On the following night the star will:
  - A) Cross the meridian at a local sidereal time of 7h27m.
  - B) Cross the meridian at a local sidereal time of 7h23m.
  - C) Cross the meridian at a CST of 22h46m.
  - D) Cross the meridian at a CST of 22h50m.
  - E) Have a right ascension of 7h23m.
  
- 4.) On the autumnal equinox:
  - A) The Sun has a declination of  $+23.5$  degrees.
  - B) The Sun has a declination of  $-23.5$  degrees.
  - C) The Sun is moving from the northern hemisphere to the southern hemisphere of the celestial sphere.
  - D) The Sun is moving from the southern hemisphere to the northern hemisphere of the celestial sphere.
  
- 5.) The rotation axis of the Earth:
  - A) Makes an angle of 23.5 degrees with respect to the axis around which the Earth orbits the Sun.
  - B) Has always pointed in exactly the same direction over the entire history of the Earth.
  - C) Lines up with the celestial north and south poles.
  - D) Lines up exactly with the poles of the Earth's magnetic field.

6.) Which of the following was Galileo responsible for?

- A) Discovering the 4 largest moons of Jupiter.
- B) Inventing the telescope.
- C) Discovering the laws that describe the orbits of planets around the Sun.
- D) Advocating the heliocentric model, based on the results of his observations.

7.) The asteroid Vesta has an orbit with a period of 3.63 years, and an eccentricity of 0.097, while the asteroid Juno has an orbit with a period of 4.36 years and an eccentricity of 0.218. This means that:

- A) Juno has a larger orbit than that of the Earth.
- B) Vesta has an orbit with semi-major axis of 2.36 AU.
- C) The semi-major axis of Juno's orbit is 1.2 times as large as that of Vesta's orbit.
- D) Vesta is always the same distance from the Sun everywhere on its orbit.

8.) Aristotle believed that:

- A) The Earth lay at the center of the universe.
- B) The planets were other worlds similar to the Earth.
- C) Philosophy and observation are equally important as tools for understanding the laws of the universe.
- D) Objects on the Earth that are in motion tend to stay in motion.

9.) Which of the following are properties of a vector?

- A) Force.
- B) Direction.
- C) Mass.
- D) Magnitude.

10.) For a planet that is on a circular orbit, which of the following remain constant?

- A) The planet's angular momentum.
- B) The planet's orbital speed.
- C) The planet's kinetic energy.
- D) The planet's gravitational potential energy.

11.) A ball is thrown up in the air. When the ball reaches its highest point:

- A) The kinetic energy of the ball is zero.
- B) The gravitational potential energy of the ball is zero.
- C) The acceleration of the ball is zero.
- D) The force acting on the ball is zero.

12.) Islamic astronomers in the middle ages:

- A) Used heliocentric models of the solar system to calculate the positions of the planets.
- B) Developed the base 60 number system.
- C) Used the stars as a guide for aligning Mosques with Mecca.
- D) Believed that Ramadan should always occur at the same time of year.

13.) An apparent solar day:

- A) Is shorter than a mean solar day.
- B) Is longer than a mean solar day.
- C) Is another name for a sidereal day.
- D) Varies in length throughout the year.