Astro 129, Homework on Section 1 and Chapter 4, Fall 2014
Name: _____ Date: Due on September 25, 2014

1. When Venus is at inferior conjunction,
   A) it is at its greatest angle from the Sun, as seen from Earth.
   B) it is at its greatest distance from Earth.
   C) the time between sunset and the time at which Venus sets is a maximum.
   D) it is at its smallest distance from Earth.

2. When Mars is at opposition, it
   A) rises at about midnight.
   B) is high in the sky at midnight.
   C) is high in the sky at sunset.
   D) is high in the sky at noon.

3. A superior planet is closest to Earth when it is near
   A) the vernal equinox.
   B) opposition.
   C) conjunction.
   D) maximum eastern elongation.

4. What is the difference between the synodic and sidereal periods of a planet?
   A) There is no difference; they are one and the same time period. The synodic period is the name used in the geocentric theory, while the sidereal period is the name used in the heliocentric theory.
   B) The synodic period refers to the planet's period with respect to Earth's motion, while the sidereal period is the true period with respect to the background stars.
   C) The synodic period refers to the planet's rotation around its axis, while the sidereal period is the time for one orbit.
   D) The synodic period refers to the planet's motion with respect to the background stars, while the sidereal period is the true period with respect to Earth's motion.

5. The time period between two successive passages of a planet through the position of opposition is
   A) its sidereal period.
   B) its synodic period.
   C) one synodic month.
   D) one year.

6. If a particular asteroid with a circular orbit is seen at opposition every 1.44 years, then its sidereal period is
   A) 0.59 years.
   B) 1.44 years.
   C) 0.44 years.
   D) 3.27 years.

7. The major contribution of Johannes Kepler to the development of modern astronomy was to
   A) develop the first mathematical heliocentric model of the solar system.
   B) observe the satellites (moons) of Jupiter.
   C) use parallax to prove that Earth moves around the Sun.
   D) prove that planetary orbits are ellipses.

8. If an object's orbit around the Sun has an eccentricity of 0.8, then the orbit is
   A) a straight line.
   B) a long, thin ellipse.
   C) almost circular.
   D) exactly circular.

9. If a new planet (tentatively predicted to exist on the basis of perturbations in the orbits of Uranus and Neptune) were to be discovered with a sidereal period of 125 years, what would be the radius of its orbit (assumed to be circular)?
   A) 8.55 AU
   B) 25 AU
   C) 1 AU
   D) 125 AU

10. If a planet were to exist in our solar system in a circular orbit with a radius of 3 AU, about how long would it take to orbit the Sun once?
   A) 27 years
   B) 3 years
   C) 2.1 years
   D) 5.2 years

11. Halley's Comet returns to the Sun's vicinity every 76 years in an elliptical orbit. (See Fig. 4-23, Freedman and Kaufmann, *Universe,* 8th ed.) What is the semimajor axis of this orbit?
    A) 17.5 AU
    B) 0.59 AU
    C) 1 AU
    D) 50.000 AU

12. What did Galileo see when he observed Venus through his telescope?
    A) Venus has phases like the Moon and has its largest angular diameter at gibbous phase.
    B) Venus has an angular size that increases and decreases markedly, but it does not show phases (e.g., crescent, gibbous).
    C) Like the Moon, Venus shows phases and its angular size remains almost constant.
    D) Venus has phases like the Moon and has its largest angular diameter at crescent phase.

13. You throw a ball straight up in the air. At its highest point the ball's
    A) velocity and acceleration are both zero.
    B) velocity is not zero but its acceleration is zero.
    C) acceleration is not zero but its velocity is zero.
    D) velocity and acceleration are both non-zero.

14. The strength of gravity on Mars is about 40% of that on Earth. If you were to visit Mars, what would happen to your mass and weight compared to when you were on Earth?
    A) Your weight would be the same but your mass would be less.
    B) Your weight and mass would both be unchanged from when you were on Earth.
    C) Your mass would be the same but your weight would be less.
    D) Your weight and mass would both be less than when you were on Earth.

15. Two objects of different mass when dropped by an astronaut on the Moon have
    A) no acceleration at all in the airless space.
    B) the same acceleration.
    C) different accelerations proportional to their masses.
    D) different accelerations, the more massive object having the smaller acceleration.

16. In which direction would Earth move if the Sun's gravitational force were suddenly removed from it?
    A) in a straight line toward the Sun
    B) It would continue in a circular orbit.
    C) in a straight line directly away from the Sun
    D) in a straight line along a tangent to its circular orbit

17. Suppose that a planet of the same mass as Earth were orbiting the Sun at a distance of 10 AU. The gravitational force on this planet due to the Sun would be
    A) 100 times the gravitational force the Sun exerts on Earth.
    B) 10 times the gravitational force the Sun exerts on Earth.
    C) 1/10 of the gravitational force the Sun exerts on Earth.
    D) 1/100 of the gravitational force the Sun exerts on Earth.

18. If the mass of the Sun were doubled, the gravitational force on Jupiter due to the Sun would
    A) stay the same.
    B) be four times its present value.
    C) be sixteen times its present value.
    D) be twice its present value.

19. If a planet moves around the Sun in a circular orbit, how many forces act on it?
    A) two forces, one toward the Sun, the other along the direction of motion
    B) one force toward the Sun
    C) two equal and opposite forces along the direction to the Sun
    D) one force in the direction of motion

20. Two spaceships that have different masses but rocket engines of identical force are at rest in space. If they fire their rockets at the same time, which ship will speed up fastest?
    A) They will not speed up at all but will move at a constant speed since they are in space and the rocket has nothing against which to push.
    B) the one with the lowest mass
    C) They will increase speed at the same rate since they have identical rocket engines.
    D) the one with the highest mass