University of Mississippi
ASTR 101, Fall 2013

Name: _____

Midterm Test 1

Choose the best answer for each multiple-choice question and enter it in the scantron sheet.

(1) Which of these is the main contribution to astronomy by Tycho Brahe?
a. He made excellent observations of the planets' positions.
b. He proposed a modern heliocentric model of the solar system.
c. He explained the orbits of planets in terms of gravity.
d. He was the first person to use a telescope for astronomy.

(2) The point directly overhead in the sky is called
a. Vernal equinox.
b. Zenith.
c. Ecliptic.
d. Meridian.

(3) According to the prevalent view in antiquity, the universe
a. Is a fictitious concept which we still talk about because it is useful for discussing objects in astronomy.
b. Is immensely larger than the Solar System.
c. Is essentially the same as the Solar System, with the addition of the sphere were the stars are located.
d. Is a small part of the Solar System.

(4) According to our present view, the universe
a. Is a fictitious concept which we still talk about because it is useful for discussing objects in astronomy.
b. Is immensely larger than the Solar System.
c. Is essentially the same as the Solar System, with the addition of the sphere were the stars are located.
d. Is a small part of the Solar System.

(5) Which one of the currently recognized planets were known before telescopes were invented?
a. Only Venus and Mars.
b. Venus, Mars, Jupiter and Saturn.
c. Mercury, Venus, Mars, Jupiter and Saturn.
d. All eight of them.

(6) Which is these statements about the planet Venus is correct?
a. It can only be seen late at night when the sky is very dark.
b. It is the slowest moving planet on the Celestial Sphere.
c. It is always close to the Moon in the sky.
d. It is always close to the Sun in the sky.

(7) Why is Isaac Newton important in the history of astronomy?
a. He made excellent observations of the planets' positions.
b. He developed the heliocentric model of the solar system we still use.
c. He explained the orbits of planets in terms of gravity.
d. He was the first person to use a telescope to make astronomical observations.

(8) If you looked at the sky from the Space Station outside the Earth's atmosphere, which objects would "twinkle"?
a. Stars would twinkle, but not planets.
b. Planets would twinkle, but not stars.
c. Both stars and planets.
d. Neither stars nor planets.

(9) When a solid body is heated to high temperatures one obtains from it
a. A continuous spectrum.
b. A line spectrum.
c. An emission line.
d. An absorption spectrum.

(10) What is the altitude of an object in the sky?
a. Its height in degrees above or below the Celestial Equator.
b. The vertical angle at which it is located above the horizon.
c. Its horizontal direction, measured clockwise from due North.
d. The elevation above sea level you have to be at to see the object.

(11) Approximately how long does it take for the Moon to go through a full cycle of phases?
a. One day.
b. 7 days.
c. 27 days.
d. 29 days.

(12) Which of the following is a reason why ancient astronomers believed in a geocentric model?
a. At that time, it was not possible to observe the stars' parallax.
b. The stars show a very obvious parallax displacement.
c. The retrograde motion of planets is best explained by geocentric models.
d. The geocentric model agreed with Copernicus' ideas.

(13) What does an object do if no force is acting on it?
a. It cannot move at all.
b. It falls straight down.
c. It either doesn't move, or moves along a straight line at constant speed.
d. It either doesn't move, or slows down and eventually comes to a stop.

(14) Do stars move?
a. No, stars are always in the same position in the sky; only planets, the Moon and the Sun move.
b. They move in our local sky because the Earth rotates, but on the celestial sphere they essentially don't.
c. They constantly move from East to West in our local sky, and from West to East on the celestial sphere.
d. Yes, their motion depends on where they are along their orbit; right now they are all in retrograde motion.

(15) What is the difference between red light and blue light?
a. Red light has a longer wavelength than blue light.
b. Red light travels slower than blue light.
c. Red light is emitted by hot objects, blue light by cold ones.
d. Red light and blue light are made of waves that oscillate in different directions.

(16) What is the ecliptic?
a. The time at which an eclipse will occur.
b. The point straight above us on the celestial sphere.
c. The line along which the Sun moves on the celestial sphere.
d. A small circle on which a planet moves, in a geocentric model.

(17) How often do solar eclipses occur?
a. Once every synodic month.
b. Once every sidereal month.
c. Once every year.
d. They don't happen at regular intervals.

(18) What is declination?
a. The downward motion of a star as it sets below the horizon.
b. The tilt angle between the Moon's orbit and the Earth's orbit.
c. The latitude of the point on the Earth where a telescope is located.
d. The angle at which an object is located above or below the Celestial Equator.

(19) What determines whether a solar eclipse is annular or total?
a. The angle at which the Earth's axis is tilted.
b. The angle at which the Moon's orbit is tilted.
c. The distance at which the Moon is from the Earth.
d. The distance at which the Sun is from the Earth.

(20) Where is the star Polaris located?
a. On the celestial equator.
b. Near the celestial North Pole.
c. On the ecliptic.
d. Near the zenith.

(21) What evidence do we have that light is made of waves?
a. Light produces diffraction and interference patterns.
b. Light can be emitted in large quantities by hot objects.
c. Light moves in straight lines, and is not affected by gravity.
d. None, in fact we know that light is made of particles, not waves.

(22) What do we mean when we say that a planet is in "retrograde motion"?
a. That it always moves in the sky in the opposite direction to all other planets.
b. That it is gradually moving away from the Sun, in an orbit that spirals slowly outward.
d. That it appears to be moving backward on the celestial sphere, as viewed from Earth.
c. That it spins backward around its axis, compared to all other planets.

(23) Do atoms and dust particles in space feel a gravitational force pulling them towards each other?
a. Yes, every object produces an attractive gravitational force on every other one.
b. No, for gravity to act one object must be much bigger than the other one.
c. No, gravity is a force that only stars and planets can produce.
d. No, there is a force of gravity but sometimes it pushes them away from each other.

(24) Can the Moon ever move in retrograde motion?
a. Yes, when it is in a waning phase it moves from East to West on the celestial sphere.
b. Yes, because the Moon orbits the Earth and not the Sun, it always is in retrogarde motion.
c. No, the Moon orbits the Earth and always moves from West to East on the celestial sphere.
d. No, the Moon orbits the Earth and therefore it never moves on the celestial sphere.

(25) Approximately how long does it take for the Moon to orbit the Earth once?
a. One day.
b. 7 days.
c. 27 days.
d. 29 days.

(26) Which of the following were ancient astronomers looking for, but failed to see?
a. Sunspots on the Sun's surface.
b. Moons around Jupiter.
c. Comets with tails.
d. Parallax for stars.

(27) How does Copernicus' model of the solar system relate to our present views?
a. Copernicus still used circles and epicycles.
b. His was the first model that exactly agreed with our current views.
c. In Copernicus' model the Moon also orbits the Sun.
d. Copernicus' model was geocentric.

(28) According to Kepler's laws, the orbit of a planet is:
a. A circle, with smaller circles added in to account for detailed observations.
b. An ellipse, with the Sun at one of the foci of the ellipse.
c. An ellipse, with the Sun at the center of the ellipse.
d. Usually an ellipse, except during periods of retrograde motion.

(29) What allowed Newton to add a few details that were not included in Kepler's laws of planet motion?
a. Newton realized that Kepler had made a few mistakes in his calculations.
b. In Newton's time there was a better understanding of what the planets and the Sun are made of.
c. In Newton's time there were better data available on the positions of the planets.
d. Newton made his predictions using his general laws of motion and gravity.

(30) What did Ptolemy assume, to explain the retrograde motion of Mars?
a. That Mars moved on a smaller circle (epicycle) superimposed on a larger one.
b. That Mars felt the gravitational attraction from other planets like Jupiter.
c. That the Earth and Mars move at different rates along their orbits.
d. That Mars had been hit in the past by a large asteroid that changed its motion.

(31) Does the Sun feel a force of gravity toward the planets?
a. Yes, the Sun actually moves just as much as the Earth does.
b. Yes, but the Sun hardly moves because it is much more massive.
c. No, the Sun only produces gravity and does not move; the planets do.
d. No, the Sun only feels a force from the center of our galaxy.

(32) Why was Galileo's discovery of the moons of Jupiter important?
a. Because it proved that objects can revolve around a body other than the Earth.
b. Because those moons had been revolving around the Earth before they escaped.
c. Because Galileo showed that life could exist on those moons.
d. Because those moons have a strong effect on our weather.

(33) Mars is the next planet after the Earth as we move away from the Sun. Therefore
a. It takes more than one Earth year for Mars to orbit the Sun.
b. It takes less than one Earth year for Mars to orbit the Sun.
c. We need more information to say which one orbits the Sun in less time.
d. The two planets (and all other ones) take the same amount of time to orbit the Sun.

(34) When a large truck collides with a bicycle, which of the following is true?
a. They both feel a force, but the truck is pushed by a smaller force than the bicyle.
b. They both feel a force, but the bicyle is pushed by a smaller force than the truck.
c. The truck and the bicycle push each other with equally large forces.
d. Only the bicycle feels a force from the truck pushing it.

(35) What kind of model for the solar system was most common in antiquity?
a. A gravitational model.
b. A celestial model.
c. A heliocentric model.
d. A geocentric model.

(36) How was Tycho Brahe able to establish that comets were more distant than the Moon?
a. He measured the time it takes a comet to complete a full orbit.
b. He found the parallax of a comet as seen from different places on Earth.
c. He measured the apparent size of a comet, as seen through a telescope.
d. He applied Newton's laws and found the force of gravity felt by a comet.

(37) In which of the following situations will tides on Earth be higher?
a. When Venus is transiting the Sun.
b. When Mars is in retrograde motion.
c. When the Moon is in its first quarter.
d. When the Moon is full.

(38) During which of the following phases can we see a lunar eclipse?
a. New Moon.
b. Half Moon.
c. Full Moon.
d. Any phase.

(39) Can you apply Kepler's laws to the orbits of moons around a planet?
a. Yes, because the force involved is still the force of gravity.
b. Yes, but only if the planet is orbiting the Sun at the same time.
c. No, because Kepler wrote down his laws only for planets.
d. No, because moons are too small.

(40) What kinds of objects can experience a force of gravity?
a. Every object exerts a force of gravity on every other one.
b. Only objects that are on or near the surface of a planet.
c. Only planets moving around a star, or moons around a planet.
d. Objects in either one of the two situations in (a) or (b).

For each of the following short-answer questions provide an answer using no more than three lines (fewer is ok).

(1) What can you do to find out whether an object you see in the sky is a star or a planet? (Without looking it up!)

(2) If the Earth did not have any atmosphere, what color would the sky be during the day? (Explain.)

(3) What is the celestial sphere?

(4) If you watched the sky for several hours one night, what changes would you see in the positions of the stars and planets?

(5) If you looked at the sky one night and then at the exact same time the following night, what changes would you see in the positions of the stars and planets?

(6) Where do the names for the seven days of the week come from?

(7) Why were Galileo's observations of the Sun and the Moon important?

(8) Do we consider Kepler's laws to provide a correct description of the planets' motion?

(9) Can an object have mass but no weight, or weight but no mass? Explain briefly.

(10) Suppose the Moon is in its waning crescent phase. Make a sketch of what it looks like from here on Earth, another one of the positions of Earth, Moon and Sun, and state approximately at what time of the day you can see the Moon.