Name __________________________________________

Physical Science 113 - Astronomy
Exam I
Indicate the most correct answer on your scantron sheet. This is only one correct answer for each question.

1. Most of the stars found in our galaxy are in multiple star systems.
   a) True      b) False

2. Which planet has a large red spot that is much like a hurricane?
   a) Mercury   b) Venus   c) Mars   d) Jupiter   e) Saturn

3. Which planet has a ring system which is visible in a small telescope from the Earth?
   a) Mercury   b) Venus   c) Mars   d) Jupiter   e) Saturn

4. Which planet is most like our moon in appearance?
   a) Mercury   b) Venus   c) Mars   d) Jupiter   e) Saturn

5. Which planet has features on its surface that seem to indicate that liquid water once flowed on its surface?
   a) Mercury   b) Venus   c) Mars   d) Jupiter   e) Saturn

6. Which planet is the largest in our solar system?
   a) Mercury   b) Venus   c) Mars   d) Jupiter   e) Saturn

7. An astronomical unit is smaller than a light year, and a light year is smaller than a parsec.
   a) True      b) False

8. The law of inertia states that all objects will come to rest if no force is exerted on them.
   a) True      b) False

9. According to Newton's laws, two objects with different masses cannot move around the earth in the same orbit.
   a) True      b) False

10. One Astronomical Unit is the distance between
    a) the Earth and the Sun
    b) the Earth and the Moon
    c) the Sun and Pluto
    d) the Sun and the nearest star
11. What time is it when a full moon rises in the East?
   a) midnight   b) sunset   c) sunrise   d) noon   e) none of these

12. On successive evenings one would find that the moon
   a) rises about 15 minutes earlier each night
   b) rises about 50 minutes later each night
   c) rises about the same time each night
   d) is somewhat unpredictable

13. The lunar (or synodic) month is 29 and 1/2 days long, while the sidereal month is
   about
   a) 25 days long
   b) 27 days long
   c) 20 days long
   d) a few minutes longer than a solar month
   e) a few minutes shorter than a solar month

14. A lunar eclipse can be observed directly overhead (or as near as can be)
   a) at sunrise
   b) at sunset
   c) at midnight
   d) never, because eclipses always occur when the moon is full
   e) at noon

15. A lunar eclipse always occurs at
   a) full moon
   b) new moon
   c) first quarter
   d) third quarter

16. If you were living on the moon, what would you observe when a person on the earth
    observed a solar eclipse?
   a) a complete hemisphere of the earth passing through a shadow.
   b) a small, nearly circular, shadow passing across the face of the earth.
   c) the whole earth pass into darkness
   d) nothing unusual

17. From the first day of spring until the first day of summer, the sun rises
   a) at about the same time each day
   b) a little bit farther north of due east each day
   c) a little bit farther south of due east each day
   d) a little bit later each day
18. Different constellations are visible at different times during the year. If we carefully observe the location of the constellations on successive nights, we find that these constellations appear to slowly move from
   a) East to West
   b) West to East
   c) North to South
   d) South to North

19. If you were journeying (on foot) toward the north (say toward Canada) and carefully recorded your observations of the North Star you would find that
   a) it always remains at the same distance above the horizon
   b) it appears to rise higher in the sky as you move northward
   c) it would appear to drop lower and lower in the sky as you move northward
   d) it would move from East to West among the other stars
   e) it would appear to move from West to East

20. If there were no atmosphere, you would be able to see the stars even when the sun were visible in the daylight sky.
   a) True           b) False

21. The early Greeks believed that the Earth was the center of the universe because
   a) They thought the Earth was the largest celestial body
   b) They could detect no motion of the Earth due to parallax
   c) All heavy rock-like objects always fall to the earth
   d) both (b) and (c)

22. Galileo's observations of Venus were not consistent with Ptolemy's geocentric model of the universe which was accepted at that time. This was because
   (a) Ptolemy's model predicted Venus would not exhibited phases like the moon
   (b) Ptolemy's model predicted a crescent phase when Venus is farthest from Earth, and Galileo observed a waxing gibbous phase when Venus is farthest from Earth.
   (c) Ptolemy's model predicted that the apparent size of Venus would not change as Venus goes through phases.
   (d) Venus has no moons
   (e) Venus is completely covered with clouds

23. The Greek astronomer who compiled the first star catalog containing about 850 stars, giving their locations and brightness.
   a. Hipparchus     b. Ptolemy    c. Anaxagoras    d. Aristarchus
   e. Eratosthenes

24. The Greek astronomer who determined the diameter of the Earth was:
   a. Hipparchus    b. Ptolemy     c. Anaxagoras    d. Aristarchus
   e. Eratosthenes
We discussed three distinct models of the solar system, developed by Ptolemy, Copernicus, and Brahe. Some of these models have common features. Use the choices below to indicate for which models the following statements are correct.

A. Ptolemy  B. Copernicus  C. Brahe  D. Both Brahe and Ptolemy  E. Both Copernicus and Brahe

25. The Earth is the center of the solar system.

26. The Sun is the center of the solar system.

27. Venus and Mercury orbit the Sun.

28. Requires epicycles and deferents to explain retrograde motion.

29. The effect of gravity between two objects increases as the two objects get closer together.
   a) True  b) False

30. According the Kepler's three laws of planetary motion,
   a) Mars should orbit the sun more rapidly than Saturn
   b) Saturn's orbit should be more eccentric than Jupiter's
   c) The planets must become larger as they get farther away from the Sun
   d) All planets move in elliptical paths, and cannot move in a circular path.

31. If the earth were a little closer to the sun
   a) the length of our seasons would be longer.
   b) the temperatures of our seasons would be higher.
   c) the length of the day would be shorter.

32. The equinox occur
   a) once every six months.
   b) only once a year.
   c) when the sun rises highest in the sky.

33. If the earth's axis of rotation were not tilted,
   a) the length of the seasons would be longer.
   b) there would be no seasons at all.
   c) the period of revolution would be equal to the period of rotation.
34. A sidereal day is __________ a solar day.
   a) 4 minutes longer than
   b) 4 minutes shorter than
   c) the same length as
   d) 15 minutes shorter than
   e) only 30 seconds shorter than

35. A total eclipse of the moon will occur whenever
   a) the moon passes through the Earth's umbral shadow
   b) the moon passes through the Earth's penumbral shadow
   c) the moon is new.
   d) the moon is full.

36. A/An ______________ is an easily recognizable group of stars which may be a part of a constellation or which may incorporate pieces of several constellations.
   a) astigmatism  b) asterism  c) nebula  d) star cluster
   e) stellar parallax

37. Which of the following planets can appear at inferior conjunction?
   a) Venus  b) Mars  c) Jupiter

38. Which of the following planets can be at opposition?
   a) Mercury  b) Venus  b) Mars

39. The group of stars through which the sun appears to move during the year is called the ________________.
   a) ecliptic  b) zodiac  c) Aurora Borealis  d) celestial sphere

40. The line that the Sun traces out through the stars as it moves across the sky during the years is called the ________________.
   a) ecliptic  b) zodiac  c) Aurora Borealis  d) celestial sphere

For the following questions, use the diagram below as a key

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A
|  Mercury  |  Venus  |
+-----------+---------+
   C         
   |         |
   |         |
   |  Earth  |
+-----------+---------+
   B
   |  Jupiter |
+-----------+---------+
   |   Saturn |
+-----------+---------+
   |  Uranus  |
+-----------+---------+
   | Neptune  |
+-----------+---------+
   |   Pluto  |
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41. For this group of planets, the periods of revolution are greater than one year.

42. This group of planets can never be seen at opposition.

43. These planets exhibit phases like the moon as seen from Earth.

44. These are the terrestrial planets.
45. These are the Jovian planets.

46. Solar and Lunar eclipses are observed to occur in cycles. If a solar eclipse is observed at a particular time, then one might expect to observe either a solar or a lunar eclipse __________ later.
   a) six weeks
   b) six months
   c) six years
   d) two years

47. One hour of sun time corresponds to how many degrees of earth's rotation?
   a) 2 1/2  
   b) 7 1/2  
   c) 15  
   d) 30  
   e) 45

48. We see the same side of the moon at all times because the:
   a) orbit of the moon is in the same plane as the orbit of the earth
   b) moon's period of rotation equals its period of revolution
   c) orbit of the moon is an ellipse
   d) inclination of the orbit of the moon to the orbit of the earth
   e) moon does not rotate

49. The moon rises on an average 51 minutes later each day. This lag in the rise of the moon is due to the:
   a) revolution of the moon in its orbit
   b) revolution of the earth in its orbit
   c) rotation of the earth
   d) inclination of the orbit of the moon to the orbit of the earth
   e) rotation of the moon and its revolution in its orbit

50. Why is there not a total eclipse of the sun by the moon once each month?
   a) The axis of the earth is tilted.
   b) The orbit of the moon is too eccentric.
   c) Two solar eclipses can occur during the same month.
   d) The distance between the earth and the sun varies during the year.
   e) The orbit of the moon is inclined to the ecliptic.

51. How many constellations are there?
   a) 12
   b) 13
   c) 24
   d) 44
   e) 88
52. If a planet travels in an ellipse around the sun, its speed should be:
   a) constant through the whole orbit by the principle of conservation of energy
   b) greatest when the planet is nearest to the sun
   c) least when the planet is nearest to the sun
   d) perhaps not constant, but greater than if it were a circular orbit

53. When the Moon passes through its phases, it is said to __________ as it is changes
    from a crescent Moon to a First Quarter Moon.
    a. wax     b. wane     c. gibbous    d. be effluent     e. be garolous

54. Diurnal motion of objects in the sky is caused by
   a. motion of the Moon across the sky.
   b. rotation of the Earth on its axis.
   c. precession of the Earth's axis.
   d. revolution of Earth around the Sun.

55. Describing a star as being in the constellation Cygnus (the Swan) tells a modern
    astronomer that the star is
   a. in a distant galaxy located in a particular direction from Earth.
   b. inside our solar system.
   c. somewhere in a particular region of sky having definite boundaries.
   d. one of a set of bright stars which make up a particular "picture" in the sky.

56. The zenith defines a direction
   a. toward the Sun at noon
   b. vertically above a point on the equator
   c. vertically above an observer
   d. vertically above the North Pole

57. If you watch (or photograph) stars near the north celestial pole for a period of
    several hours, in what basic pattern do they appear to move?
    a. Almost straight lines, rising from the horizon toward the zenith.
    b. Ellipses, with the north pole at one focus.
    c. Circles, with the north celestial pole at the center.
    d. Spirals, as the stars move while the Earth rotates.

58. Over the period of one complete year, an observer at the South Pole would be able
    to see what fraction of the overall sky?
    a. 100%.
    b. A variable amount, depending upon his longitude.
    c. A variable amount, depending upon which year.
    d. 50%.
59. The region above the Arctic Circle is often called the "Land of the Midnight Sun" is so-named because
   a. the Sun is above the horizon for a full 24 hours at certain times of the year.
   b. the Sun passes overhead at least once during the year from this region.
   c. twilight is bright and lasts all night throughout the summer months since the Sun never gets far below the horizon from these locations.
   d. the full Moon is always up whenever the Sun sets, maintaining light skies throughout the summer months.

60. Which of the following is the correct sequence of appearances of Moon phases in the sky?
   a. New moon, full moon, waxing crescent, waning crescent.
   b. Waxing crescent, first quarter, waxing gibbous, full moon.
   c. New moon, waning crescent, first quarter, full moon.
   d. Full moon, waxing gibbous, third quarter, waning crescent.

61. If you were on the Moon at the dividing line between dark and light, (the terminator) at a particular time, say sunrise, how long would it be before this dividing line returned to your position?
   a. 23 hours 56 minutes.
   b. 27½ days.
   c. 29½ days.
   d. 365¼ days.

62. The size of the Earth's shadow when it reaches the orbital distance of the Moon is
   a. considerably wider than the Moon.
   b. slightly less wide than the size of the Moon.
   c. almost exactly as wide as the Moon.
   d. extremely small, leaving only a narrow shadow band on the Moon during eclipse.

63. What is the maximum length of totality for a lunar eclipse?
   a. several hours.
   b. seven minutes.
   c. about two minutes.
   d. about one hour and forty minutes.
64. When in total lunar eclipse, the Moon shows a reddish color because
   a. the red light is the residual thermal glow from a still-warm Moon, after the
      abrupt removal of the heat of the Sun.
   b. only the red part of the solar spectrum is deflected onto it by the Earth's
      atmosphere.
   c. the Moon is illuminated only by the residual glow from the dark side of the
      Earth, which is predominantly red.
   d. light from the northern and southern lights (the aurora) on Earth, which are
      predominantly red, illuminates the Moon.

65. Which of the following factors makes it far more likely that a person will have seen
    a total lunar eclipse than a total solar eclipse?
   a. Total solar eclipses occur much less frequently than total lunar eclipses.
   b. A total lunar eclipse occurs at full Moon when the Moon is bright and high in
      the sky while a total solar eclipse occurs at new Moon when the Moon is dark
      and low in the sky.
   c. A total lunar eclipse can be seen by people on most of the nighttime side of
      Earth while a specific total solar eclipse can only be seen by people within a
      narrow strip of the Earth's surface.
   d. The Moon appears brighter during a total lunar eclipse than does the Sun
      during a total solar eclipse.

66. Which of the following parameters will dictate whether a particular solar eclipse
    appears as a total or an annular eclipse to an observer on the center-line of the
    Moon's shadow?
   a. The time of day or night.
   b. The distance of the Moon from the Earth at the time of eclipse.
   c. The phase of the Moon, whether it is new, quarter or full.
   d. The distance of the Earth from the Sun at the time of eclipse.

67. What is the maximum time of totality for any total solar eclipse observed from the
    Earth's surface?
   a. About 7.5 minutes.
   b. A full 12 hour period.
   c. About 2 hours.
   d. Only a few seconds.
68. The term retrograde motion for a planet refers to
   a. a reversal in the apparent direction of motion of a planet past the background stars as seen from the Earth.
   b. the motion of a planet which orbits around the Sun in the opposite direction to the motion of the other planets.
   c. the apparent east to west motion of a planet as seen by an observer on the Earth, due to the Earth's rotation.
   d. the motion of a planet around its deferrent in the geocentric model of the solar system.

69. The direction of retrograde motion for a planet as seen by an observer on the Earth is
   a. from west to east relative to the background stars.
   b. from east to west relative to the background stars.
   c. from east to west relative to objects on the person's horizon.
   d. from west to east relative to objects on the person's horizon.

70. When Mercury is at its farthest distance from the Earth, it is at
   a. superior conjunction.
   b. opposition.
   c. inferior conjunction.
   d. greatest elongation.

71. If an object has an orbit around the Sun that has an eccentricity of 0.1, then the orbit is
   a. a straight line.
   b. exactly circular.
   c. almost circular, but not quite.
   d. a long, thin ellipse.

72. If an object has an orbit around the Sun that has an eccentricity of 0.8, then the orbit is
   a. exactly circular.
   b. a straight line.
   c. a long, thin ellipse.
   d. almost circular, but not quite.

73. Which point in a comet's orbit is closest to the Sun?
   a. Greatest elongation.
   b. Perihelion.
   c. Aphelion.
   d. Inferior conjunction.
74. Who was the first astronomer to use a telescope for viewing the sky?
   a. Ptolemy.
   b. Galileo.
   c. Newton.
   d. Brahe.

75. How many moons of Jupiter did Galileo see?
   a. 12
   b. None, he was unable to see them with the naked eye.
   c. 4
   d. Only one.