Name_____

Please sign your exam form, and your SCANTRON form. Also, be sure to include your student number on the SCANTRON form and fill in the appropriate bubbles. When finished with the exam, place your SCANTRON form inside the exam and hand in both to the proctor in the front of the class.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The path the Sun follows as it *moves* through the stars is called the _____,   1) _____
   A) Analemma
   B) semi–major axis
   C) Prime Meridian
   D) Celestial Equator
   E) Ecliptic

2) The daily rising and setting of the stars is caused by _____.   2) _____
   A) the revolution of the Earth about the Sun
   B) the slow rotation in the direction of the Earth's rotation axis
   C) the rotation of the Earth on its axis
   D) the annual motion of the Sun about the Earth
   E) the small difference between the Solar and Sidereal days

3) In ancient times astronomy developed because people recognized that Celestial objects _____: 3) _____
   A) helped them to understand the nature and origin of the Universe
   B) served as accurate and practical clocks
   C) and the memorization of the constellations were an important rites of passage to adulthood
   D) were evidence for visitations by ancient astronauts

4) During the summer in Eugene, OR _____.   4) _____
   A) the sidereal day increases in length to 24 hours and 4 minutes.
   B) less than half of the Sun's diurnal circle is above the horizon.
   C) the Sun undergoes retrograde motion.
   D) the Solar Day has its longest length
   E) sunlight strikes the ground more directly than in winter.

5) The concept of the Celestial Sphere was originated by _____.   5) _____
   A) the ancient Egyptians
   B) the ancient Greeks
   C) the ancient Chinese
   D) the American Indians
   E) the Maya

6) The places where the Sun crosses the Celestial Equator are called the _____ .   6) _____
    A) prime meridians.
    B) annelemmas.
    C) solstices.
    D) zeniths.
    E) equinoxes.

7) Circumpolar stars are _____ .   7) _____
    A) stars that are only seen by observers at the equator of the Earth
    B) stars that do not rise or set over the course of a day
    C) stars that can only be seen on the equinoxes
    D) stars that can only be seen during the winter for an observer in Eugene, OR
    E) the stars (constellations) that lie along the Zodiac

8) The retrograde episodes of Mars, as seen from the Earth, recur _____ .   8) _____
    A) roughly every 2.1 years
    B) every 1.88 years, on the orbital period of Mars
    C) four times per year, at the solstices and the equinoxes
    D) two times per year, at the Winter and Summer solstices
    E) once every year, on the orbital period of the Earth

9) Honolulu, Hawaii lies at 21.3 degrees north latitude. For an observer in Honolulu, where on the   9) _____
sky is Polaris at 9 PM on January 1st?
    A) overhead
    B) 21.3 degree high in the north
    C) 68.7 degrees high in the south
    D) not visible for another six hours
    E) not visible ever

10) Solar eclipses occur _____ .   10) _____
    A) every month whenever the Moon is new
    B) every month whenever the Moon is full
    C) only on the winter solstice and when the Moon is full
    D) roughly every six months during eclipse seasons and when the Moon is new
    E) every two weeks when the Moon is at either first quarter or third quarter

11) How long is the precession cycle?   11) _____
    A) 26,000 years
    B) 29.5 days
    C) 1 day
    D) 365.24 days
    E) 18 years, 11.3 days

12) The Law of Universal Gravitation was developed by _____ .   12) _____
    A) Galileo
    B) Newton
    C) Copernicus
    D) Kepler
    E) Tycho Brahe

13) If high tide occurred at around sunrise yesterday, what was the phase of the Moon at that time?   13) _____
    A) new moon
    B) waxing crescent moon
    C) third quarter moon
    D) full moon
    E) The Moon could have either been new or full.

14) Where on Earth can you observe all the stars in the sky over an entire year?   14) _____
    A) At all locations within 23.5 degrees of the equator.
    B) At all locations within 23.5 degrees of the North or South Poles.
    C) Equator
    D) Only at the North Pole.
    E) Any observer on Earth can observe all of the stars over the course of a year .

15) The first scientist to propose a *heliocentric* model for the Solar System was _____ .   15) _____
    A) Copernicus
    B) Aristarchus
    C) Tycho
    D) Kepler
    E) Ptolemy

16) The Solar Day is longest when _____ .   16) _____
    A) the Earth, the Moon, and the Sun are aligned
    B) marks the first day of spring in the Northern hemisphere
    C) the Sun is the farthest from the Sun in its orbit
    D) the Earth moves fastest in its orbit about the Sun
    E) the Sun is at the Summer Solstice

17) Which of the following statements is true on the Autumnal Equinox?   17) _____
    A) The Sun passes directly overhead for an observer at the North Pole.
    B) The Sun is the farthest north of the Celestial Equator on this date.
    C) The Sun rises due West and sets in the East.
    D) The Sun first rises above the horizon for an observer at the North Pole.
    E) The Sun is above the horizon for half of the day for an observer in , OR.

18) The sidereal orbital period of the Earth about the Sun is given by _____ .   18) _____
    A) the period on which seasonal variations on the Earth repeat
    B) the time it takes for eclipse seasons to recur.
    C) the time it takes for the Moon to run through its cycle of phases.
    D) the time it takes the Earth to orbit the Sun, relative to the stars.
    E) the time it takes for the Sun to retrograde during an equinox.

19) Copernicus explained retrograde motion as follows.   19) _____
    A) The apparent reversal in the motion of the planets through the stars arises because of the
        effects of annual trigonometric parallax
    B) The planets move on epicycles whose centers move along deferents.
    C) Retrograde motion occurs when a nearby star passes through the Solar System
    D) Retrograde motion occurs when a faster moving planet overtakes a slower moving planet.
    E) The apparent reversal in the motion of the planets through the stars is caused by the motion
        of the Earth's rotation axis known as *precession*

20) Where would you be if the Sun sets and remains below the horizon for six continuous months, beginning on September 23rd?
    A) Arctic Circle
    B) Antarctic Circle
    C) Equator
    D) North Pole
    E) South Pole

21) The Ptolemaic model (the geocentric model) of the Solar System _____ .
    A) explained and predicted the motions of the planets with deferents and epicycles.
    B) could not account for the lack of observed annual trigonometric parallax
    C) is the basis of our modern understanding of the Universe.
    D) describes the orbits of the planets as being ellipses, not circles.
    E) always kept Mars and Mercury between the Earth and Sun.

22) The force of gravity between two iron balls separated by a distance of 2 meters _____ .
    A) depends strongly on the chemical composition of the balls
    B) would increase if the masses of the balls were increased, but would decrease if the balls were moved farther apart
    C) depends on their temperatures of the balls in that if the balls were made hotter, the force of gravity would increase in strength
    D) depends on the density and diameter of each ball in addition to their masses and separation
    E) was first understood and explained by Aristotle

23) The greatest contribution to astronomy made by Tycho Brahe was _____ .
    A) his discovery that the planets' orbits around the Sun were ellipses, not circles.
    B) his discovery of the moons of Jupiter, before Galileo noted them.
    C) his demonstration that retrograde motion must be explained by epicycles larger than those of Ptolemy.
    D) his discovery that the Earth was not the center of the Universe.
    E) his precise and complete observations of planetary motions.

24) According to Kepler's third law, the square of a planet's period in years is _____ .
    A) equal to the interval in time on which the planet exhibits retrograde episodes
    B) proportional to the cube of its semimajor axis in Astronomical Units (A.U.s)
    C) inversely proportional to its mass in kilograms.
    D) a measure of how eccentric is the orbit of the planet
    E) depends on the product of the mass of the Sun and the mass of the planet

25) Which statement about the day is TRUE?
    A) The Solar day is based on consecutive passages of a given star through the Meridian.
    B) The Sidereal day is slowly decreasing in length due to tidal interactions with the Moon.
    C) Relative to the stars, the Earth spins once in 24 hours.
    D) The Sidereal day is four minutes shorter than the Solar day, on average
    E) Normal timekeeping (our clock time) is based on the Sidereal day.

26) Which of the following is a **FALSE** statement about the motions of the planets?   26) _____
    A) Planets whose orbits are smaller in size than that of the Earth may exhibit a new phase for observers on or near the Earth.
    B) Planets rise in the west and set in the east when they undergo retrograde motion, as seen by an observer in Eugene, OR.
    C) Planets move through the Zodiac constellations, usually in the west-to-east direction.
    D) Planets orbit about the Sun roughly in the ecliptic plane
    E) Retrograde motions are seen whenever the Earth overtakes a slower moving planet.

27) The ancient Greeks argued that the Earth was spherical in shape because _____ .   27) _____
    A) the shape of the shadow covering the Moon during a Lunar eclipse was curved
    B) the sky changed in appearance as an observer on the Earth moved in latitude
    C) the shadow crossing the Sun during a Solar eclipse was curved
    D) both A and B were used by the Greeks to argue that the Earth was spherical
    E) A , B, and C were all used by the Greeks to argue that the Earth was spherical

28) Scientists today do not accept the geocentric models for the Solar System because _____ .   28) _____
    A) it has been shown that the Greeks did not use actual data; they based their models on pure logic.
    B) geocentric modes had no explanation for retrograde motion.
    C) geocentric models are too complicated when compared to Copernicus' heliocentric model.
    D) the work of Tycho and Kepler showed the heliocentric model was more accurate.
    E) they are ancient history.

29) The times when the Sun reaches points furthest north and south of the Celestial equator are   29) _____
    _____ .
    A) known as the nadirs and zeniths
    B) the beginning and ending of the eclipse seasons
    C) the equinoxes
    D) referred to as meridians
    E) the solstices

30) An important observation which led the Greeks to conclude that the Earth was stationary and did   30) _____
not orbit the Sun was ____
    A) the changing appearance of the sky as an observer changed latitude on the surface of the Earth
    B) the failure to detect annual trigonometric parallax
    C) the regular changing of the phases of the Moon
    D) the occurrence of Solar and Lunar eclipses
    E) the changing of the seasons on the Earth

31) Which of the following objects does not go through the full cycle of phases--New, 1st Quarter,   31) _____
Full, 3rd Quarter, and back to New.
    A) Venus
    B) Moon
    C) Mars
    D) Mercury
    E) All of the above objects exhibit the full cycle of phases.

32) Which concept was NOT a part of Kepler's Laws of Planetary Motion?   32) _____
     A) Epicycles are needed to explain the varying brightnesses of the planets.
     B) The line that connects the Sun to Mercury sweeps out the same area in a month as does the
        line connecting us to the Sun.
     C) All planetary orbits are ellipses.
     D) A planet must move fastest in its orbit at perihelion.
     E) The square of the planet's period is equal to the cube of its average distance.

33) An observer on the equator sees the Moon **set** around midnight. What is the phase of the Moon?   33) _____
     A) new
     B) first quarter
     C) full
     D) third quarter
     E) could be either full or new

34) If the topical year was 365.5 days long, we would have leap years every _____ .   34) _____
     A) We would have no need for leap years
     B) 4 years
     C) year divisible by 100
     D) year
     E) other year

35) Scientists today do not accept the Ptolemaic model (geocentric model) because _____ .   35) _____
     A) it was too complicated, compared to Copernicus' heliocentric model.
     B) it has been shown that Ptolemy faked his data.
     C) it is ancient history.
     D) it had no explanation for retrograde motion.
     E) the work of Tycho Brahe and Kepler showed the heliocentric model was more accurate.

36) The Moon is at first quarter. Roughly, at what time will it rise for an observer at mid-northern   36) _____
   latitudes?
     A) sunrise
     B) noon
     C) sunset
     D) midnight
     E) It could either rise at noon or midnight depending on the season.

37) The *morning* or *evening* star(s) is (are) _____ .   37) _____
     A) Venus
     B) Mercury
     C) Mars
     D) Only Mercury and Venus are *morning* and *evening* stars.
     E) Mercury, Venus, and Mars are all *morning* and *evening* stars.

38) Copernicus adopted the heliocentric theory because _____ .

    A) annual trigonometric parallax was finally detected just before he died

    B) the laws of physics, as understood in his day, indicated that the Heliocentric model was correct

    C) Copernicus found heliocentric models more aesthetically pleasing

    D) new, more accurate observations favored the heliocentric model over the geocentric model

    E) the Universe was discovered to be much larger than had been previously thought when Copernicus was a young man

38) _____

39) All planets orbit about the Sun in nearly _____ .

    A) the plane defined by the equator of the Earth

    B) the region around the Celestial Equator on the sky

    C) the plane defined by the deferent of the Earth's orbit

    D) the plane of the equant.

    E) the ecliptic plane

39) _____

40) Seasonal variations in the northern hemisphere of the Earth are caused by _____ .

    A) the varying distance of the Earth from the Sun

    B) the varying length of the Solar Day over the year

    C) the interaction between the Earth and the Moon which also leads to the slow rotation of the Earth's spin axis

    D) the variable difference between the Solar and sidereal days

    E) the 23.5 degree misalignment between the Earth's rotation axis and the perpendicular to the Earth's orbital plane

40) _____

1) E
2) C
3) B
4) E
5) B
6) E
7) B
8) A
9) B
10) D
11) A
12) B
13) C
14) C
15) B
16) D
17) E
18) D
19) D
20) D
21) A
22) B
23) E
24) B
25) D
26) B
27) D
28) D
29) E
30) B
31) C
32) A
33) B
34) E
35) E
36) B
37) D
38) C
39) E
40) E