ASTR 138 Fall 2017 Exam 1 – 9/19/2017 - ANSWERED

1) An observer vacations in Canada on the 50˚ north latitude line and goes star gazing. How many degrees above the horizon is the north star?
   a) It is not visible; it is below the horizon
   b) 23.5˚
   c) 40˚
   d) 50˚
   e) 90˚
2) An observer is located in Mexico, at 25˚ north latitude. Can the observer see the north celestial pole?
   a) Yes
   b) No
   c) Sometimes
3) The same Mexican observer plants a vertical pole and watches the shadow cast by the sun over the course of a year. When does the pole cast no shadow at noon?
   a) Never. It always casts a shadow.
   b) Twice yearly, on the equinoxes
   c) Twice yearly, between the equinoxes and the Dec 21 solstice
   d) Twice yearly, between the equinoxes and the June 21 solstice
   e) Once yearly, near June 21
4) Which person sees the most circumpolar stars?
   a) The Venezuelan (10˚ N. latitude)
   b) The Costa Rican (20˚ N. latitude)
   c) The Texan (32˚ N. latitude)
   d) The Alaskan (58˚ N. latitude)
5) As viewed from the north, planets orbit
   a) clockwise
   b) counterclockwise
6) Direct motion (sometimes called prograde motion) for a planet is
   a) west-to-east
   b) east-to-west
   c) south-to-north
   d) none of the above
7) Greek astronomer Aristarchus (who improved on Aristotle) used the curve of earth's shadow on the moon during a partial lunar eclipse to argue that the earth was about 4 times larger in diameter than the moon.
   a) True
   b) False
8) How much time elapses between a star's rising time and setting time?
   a) Less than 12 hours
   b) 12 hours
   c) More than 12 hours
   d) It depends on the star
9) On the celestial sphere, the zero of the right ascension coordinate is located at
   a) the vernal equinox
   b) the celestial equator
   c) the celestial north pole

d) the celestial south pole

10) What time of day is a 3rd quarter moon highest in the sky?
    a) 6 p.m.
    b) midnight
    c) 6 a.m.
    d) noon
11) On August 1, a careful observer notes the exact compass point on the horizon where the sun rises. A few days later, the sun rises
    a) further north
    b) at the same place
    c) further south
12) On February 17, a careful observer notes the exact point on the horizon where the star Arcturus rises. On February 24, Arcturus rises
    a) further north
    b) at the same place
    c) further south
13) If the earth's orbit were exactly circular instead of elliptical, would the heat and cold of the seasons be different?
    a) the seasons would be more intense (greater hot-to-cold swings)
    b) the seasons would not perceptibly change
    c) the seasons would be less intense
14) If the earth's axial tilt was changed from 23.5˚ to 15˚,
    a) the seasons would be more intense
    b) the seasons would not perceptibly change
    c) the seasons would be less intense
15) Keeping Kepler's first law, that orbits are ellipses with the sun at one focus, in mind, what is at the center of the orbit of Pluto?
    a) the sun
    b) the earth
    c) no object
    d) Mercury
16) The Greeks preferred cosmological models that used
    a) spheres
    b) the 5 Platonic solids
    c) ellipses
    d) the 'golden ratio'
17) Constellations are
    a) Recognizable patterns of stars in the sky. The stars are not physically associated.
    b) Recognizable patterns of stars in the sky. The stars are physically associated.
    c) Physically associated stars that do not necessarily make a pattern on the sky
18) What sort of light has the shortest wavelength?
    a) Radio waves
    b) Infrared light
    c) X rays
    d) Visible light
    e) Microwaves
19) What sort of light has the longest wavelength?
    a) Ultraviolet
    b) Blue (visible) light
    c) Red (visible) light
    d) Radio waves

20) What sort of light travels the fastest?
    a) Blue (visible) light
    b) Red (visible) light
    c) Both travel the same speed.
21) What coordinates are useful for locating geographical locations, such as cities, on earth?
    a) right ascension and declination
    b) x and y
    c) longitude and latitude
    d) azimuth and altitude
22) What item in this list is not part of "local" coordinates?
    a) meridian
    b) N, S, E, and W compass points
    c) zenith
    d) vernal equinox
    e) nadir
23) What is the ecliptic?
    a) the plane of the earth and the moon
    b) the plane of the earth and the sun
    c) the plane of the earth's equator
    d) the plane of the sun's equator
24) What is the obliquity of the earth, also known less precisely as its "tilt?"
    a) 0˚
    b) 15˚
    c) 23 ½ ˚
    d) 45˚
    e) 66 ½ ˚
25) The obliquity of the earth is the angle between which two planes?
    a) celestial equator, moon's orbit
    b) prime meridian, celestial equator
    c) azimuth, altitude
    d) ecliptic, celestial equator
26) During a crescent moon, what causes the dark portion?
    a) The earth casts a shadow on the moon
    b) Sunlight does not strike that portion
    c) The dark portion does not exist. Only the crescent physically exists.
27) During a solar eclipse, what bodies line up? (In the correct order.)
    a) sun – moon – earth
    b) sun – earth – moon
    c) earth – sun – moon
28) When is a first quarter moon on the meridian (high in the sky, exactly south)?
    a) noon
    b) 6 pm
    c) midnight
    d) 6 am
29) When is a full moon on the meridian?
    a) noon
    b) 6 pm
    c) midnight
    d) 6 am
30) About how long does it take the earth to orbit the sun once?
    a) 1 day

b) 29 days
c) 365 days
d) 26,000 days

Short answer (1 point)

31) What German Renaissance scientist geometrically solved the puzzle of the motion of the planets? Kepler
32) What Danish Renaissance scientist was the best observer of his day, and amassed a catalog of star and planet positions that would lead to cracking the puzzle of planetary motion shortly after his death? Tycho Brahe
33) What Polish Renaissance scientist proposed that the center of motion in the solar system is the sun, not the earth? Copernicus
34) What Italian Renaissance scientist applied a telescope to astronomical objects and discovered the phases of Venus, sunspots, lunar mountains, and the first four moons of Jupiter? Galileo
35) What sickly English theoretician co-invented calculus, proposed a simple law of gravity, and predicted the correct motion of planets mathematically? Newton

Longer answer (5 points)

36) Fill in this table:

event	**date**	**Sun's Right Ascension**	**Sun's Declination**
Vernal Equinox		0 hours	
		6 hours	
		12 hours	
		18 hours	