Name___________________________________

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

1) When someone on Earth observes the Moon in the first-quarter phase, someone on the Moon facing Earth observes Earth in the
   A) new Earth phase.
   B) first-quarter Earth phase.
   C) full Earth phase.
   D) third-quarter Earth phase.
   E) crescent Earth phase.

2) How many arcseconds are in one degree?
   A) 360   B) 3,600   C) 100   D) 60   E) 10,000

3) What is a circumpolar star?
   A) a star that always remains above your horizon
   B) a star that is close to the south celestial pole
   C) A star that is visible from the Arctic or Antarctic circles
   D) a star that is close to the north celestial pole
   E) a star that makes a daily circle around the celestial sphere

4) Where is our solar system located within the Milky Way Galaxy?
   A) roughly halfway between the center and the edge of the visible disk of the galaxy
   B) very near the center of the galaxy
   C) It is located in the halo of the galaxy.
   D) at the far edge of the galaxy's visible disk

5) What is an astronomical unit?
   A) the average speed of the earth around the Sun
   B) the length of time it takes the earth to revolve around the Sun
   C) any basic unit used in astronomy
   D) the average distance from the earth to the Sun
   E) the diameter of the earth's orbit around the Sun

6) If you double the distance between two large masses, the gravitational force between them
   A) also doubles.
   B) weakens by a factor of 2.
   C) weakens by a factor of 4.
   D) is unaffected.
   E) strengthens by a factor of 4.
7) You are standing on a scale in an elevator. Suddenly you notice your weight decreases. What do you conclude?
   A) The elevator is moving at a constant velocity upwards.
   B) The elevator is accelerating downwards.
   C) Your diet is working.
   D) The elevator is accelerating upwards.
   E) The elevator is moving at a constant velocity downwards.

8) Which of the following wavelength regions cannot be studied with telescopes on the ground?
   A) radio waves
   B) X-rays
   C) ultraviolet
   D) both B and C
   E) both A and C

9) Why were ancient peoples unable to detect stellar parallax?
   A) They did detect it, but they rejected the observations.
   B) They did not observe for long enough periods of time.
   C) They could not see distant stars.
   D) They did not have the ability to measure very small angles.
   E) They did not look for it.

10) At which lunar phase(s) are tides least pronounced (e.g., the lowest high tides)?
    A) full moon
    B) new moon
    C) first quarter
    D) both new and full moons
    E) both first and third quarters

11) The Chandra X-ray Observatory must operate in space because:
    A) it was built by NASA.
    B) X rays are too dangerous to be allowed on the ground.
    C) X rays do not penetrate Earth’s atmosphere.
    D) X-ray telescopes require the use of grazing incidence mirrors.

12) Why do we see essentially the same face of the Moon at all times?
    A) because the other face points toward us only at new moon, when we can’t see the Moon
    B) because the Moon has a nearly circular orbit around the earth
    C) because the Moon’s rotational and orbital periods are equal
    D) because the Sun illuminates only one half at a time
    E) because the Moon does not rotate

13) You are standing on Earth’s equator. Which way is Polaris, the North star?
    A) The answer depends on whether it’s winter or summer.
    B) The answer depends on what time of day (or night) it is.
    C) on the northern horizon
    D) 30 degrees up, due West
    E) directly overhead
14) Where did the elements heavier than hydrogen and helium come from?  
A) They were produced inside stars.  
B) They were produced in the Big Bang.  
C) They were produced inside dense interstellar gas.  
D) They evolved from hydrogen and helium shortly after the Big Bang.  
E) all of the above  

15) From lowest energy to highest energy, which of the following correctly orders the different categories of electromagnetic radiation?  
A) visible light, infrared, X-rays, ultraviolet, gamma rays, radio  
B) infrared, visible light, ultraviolet, X-rays, gamma rays, radio  
C) radio, infrared, visible light, ultraviolet, X-rays, gamma rays  
D) gamma rays, X-rays, visible light, ultraviolet, infrared, radio  
E) radio, X-rays, visible light, ultraviolet, infrared, gamma rays  

16) An atom of the element iron has an atomic number of 26 and an atomic mass number of 56. If it is neutral, how many protons, neutrons, and electrons does it have?  
A) 13 protons, 56 neutrons, 13 electrons  
B) 26 protons, 30 neutrons, 30 electrons  
C) 13 protons, 43 neutrons, 13 electrons  
D) 26 protons, 56 neutrons, 26 electrons  
E) 26 protons, 30 neutrons, 26 electrons  

17) What is the ecliptic?  
A) when the Moon passes in front of the Sun  
B) the Moon's apparent path along the celestial sphere  
C) the Sun's daily path across the sky  
D) the Sun's apparent path along the celestial sphere  
E) the constellations commonly used in astrology to predict the future  

18) The amount of gravitational potential energy released as an object falls depends on  
A) its speed at the time it begins falling.  
B) the distance it falls.  
C) neither the distance it falls nor its speed at the time it begins falling.  
D) the distance it falls and its speed at the time it begins falling.  

19) Patterns of stars in constellations hardly change in appearance over times of even a few thousand years. Why?  
A) Stars within a constellation move together as a group, which tends to hide their actual motion and prevent the pattern from changing.  
B) Although most stars move through the sky, the brightest stars do not, and these are the ones that trace the patterns we see in the constellations.  
C) The stars in our sky actually move rapidly relative to us—thousands of kilometers per hour—but are so far away that it takes a long time for this motion to make a noticeable change in the patterns in the sky.  
D) Stars are fixed and never move.  
E) Stars move, but they move very slowly—only a few kilometers in a thousand years.  

20) Currently, the largest optical telescope mirrors have a diameter of  
A) 100 m.  
B) 1 m.  
C) 5 m.  
D) 10 m.  
E) 2 m.  

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