

Name _____

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

- 1) A television advertisement claiming that a product is light-years ahead of its time does not make sense because _____. 1) _____
 - A) light-years can only be used to talk about light
 - B) it uses "light-years" to talk about time, but a light-year is a unit of distance
 - C) it doesn't specify the number of light-years
 - D) a light-year is an astronomically large unit, so a product could not possibly be so advanced

- 2) Where is our solar system located within the Milky Way Galaxy? 2) _____
 - A) roughly halfway between the center and the edge of the visible disk of the galaxy
 - B) at the far edge of the galaxy's visible disk
 - C) in the halo of the galaxy
 - D) very near the center of the galaxy

- 3) Which of the following statements does *not* use the term *angular size* or *angular distance* correctly? 3) _____
 - A) The angular distance between those two houses in the distance is 30 degrees.
 - B) The angular size of the Sun is about the same as that of the Moon.
 - C) You can use your outstretched hand against the sky to estimate angular sizes and angular distances.
 - D) The angular distance between those two bright stars in the sky is about 2 meters.

- 4) Suppose we look at two distant galaxies: Galaxy 1 is twice as far away as Galaxy 2. In that case, _____ 4) _____
 - A) we are seeing Galaxy 1 as it looked at a *later* time in the history of the universe than Galaxy 2
 - B) Galaxy 2 must be twice as old as Galaxy 1
 - C) Galaxy 1 must be twice as big as Galaxy 2
 - D) we are seeing Galaxy 1 as it looked at an *earlier* time in the history of the universe than Galaxy 2

- 5) An astronomical unit (AU) is _____. 5) _____
 - A) the *average* distance between Earth and the Sun
 - B) any very large unit, such as a light-year
 - C) the *current* distance between Earth and the Sun
 - D) the average distance between any planet and the Sun

- 6) All the following statements are true. Which one explains the reason that there is *not* a solar eclipse at every new Moon? 6) _____
 - A) The nodes of the Moon's orbit precess with an 18-year period.
 - B) The orbital plane of the Moon is tilted slightly (by about 5 degrees) to the ecliptic plane.
 - C) The Moon goes through a complete cycle of phases about every 29 1/2 days.
 - D) The Moon is only about 1/4 as large as Earth in diameter.

- 7) The Sun's path, as viewed from the equator, is highest in the sky on _____. 7) _____
 - A) the spring and fall equinoxes
 - B) the summer solstice
 - C) the winter solstice
 - D) the day when Earth is closest to the Sun

- 8) What is the ecliptic plane? 8) _____
 - A) the plane of Earth's equator
 - B) the plane of the Sun's equator

- C) the plane of Earth's orbit around the Sun D) the plane of the Milky Way Galaxy

- 9) Suppose we make a scale model of our solar system, with the Sun the size of a grapefruit. Which of the following best describes what the planets would look like? 9) _____
- A) The planets range in size from about the size of a marble to the size of a baseball. They are spread out over a region about the size of a football field.
 - B) The planets are all much smaller than the Sun and are spread out evenly over a distance about the length of a large classroom.
 - C) The planets are all much smaller than the Sun. Four planets are within about 20 meters of the Sun, while the rest planets are spread much farther apart.
 - D) The planets are all much smaller than the Sun. Four planets are located within a few centimeters of the Sun, and four planets are located at distances ranging up to about a meter.
- 10) On a scale where the Sun is about the size of a grapefruit and the Earth is about 15 meters away, how far away are the nearest stars besides the Sun? 10) _____
- A) about the distance across the United States
 - B) about the distance across 50 football fields
 - C) about the distance across the state of Delaware
 - D) 100 meters
- 11) The term *observable universe* refers to _____. 11) _____
- A) the portion of the universe that is not hidden from view by, for example, being below the horizon
 - B) the portion of the universe that can be seen by the naked eye
 - C) that portion of the universe that we can see *in principle*, given the current age of the universe
 - D) that portion of the universe that we have so far photographed through telescopes
- 12) Which of the following statements about the celestial sphere is NOT true? 12) _____
- A) The "celestial sphere" is another name for our universe.
 - B) When we look in the sky, the stars all appear to be located on the celestial sphere.
 - C) The celestial sphere does not exist physically.
 - D) The Earth is placed at the center of the celestial sphere.
- 13) What do we mean when we talk about the *Milky Way* in our sky? 13) _____
- A) the spiral-shaped galaxy in which we live
 - B) the patchy band of light that outlines the *plane* of the Milky Way Galaxy as seen from Earth
 - C) the whitish patch of light we see when we look toward the *center* of the Milky Way Galaxy
 - D) the bright stars of the constellations that lie along the ecliptic in our sky
- 14) During the time that a planet is in its period of *apparent retrograde motion*, 14) _____
- A) over many days or weeks, the planet moves westward relative to the stars, rather than the usual eastward relative to the stars.
 - B) the planet moves backwards (clockwise as viewed from above Earth's north pole) in its orbit of the Sun.
 - C) the planet appears to rise in the west and set in the east, rather than the usual rising in the east and setting in the west.
 - D) the planet is getting closer to the Sun in its orbit.
- 15) When traveling north from the United States into Canada, you'll see the North Star (Polaris) getting _____. 15) _____

- A) higher in the sky
- B) brighter
- C) lower in the sky
- D) dimmer

- 16) Which of the following best describes what we mean by the *universe*? 16) _____
- A) the sum total of all matter and energy
 - B) all the galaxies in all the superclusters
 - C) a vast collection of stars that number as many as the grains of sand on all the beaches on Earth
 - D) The universe is another name for our Milky Way Galaxy.
- 17) How does Earth's varying distance from the Sun affect our seasons? 17) _____
- A) It doesn't—Earth's orbital distance plays no significant role in the seasons.
 - B) It is responsible for the fact that the seasons are opposite in the Northern and Southern hemispheres.
 - C) It causes the seasons to be more extreme than they would be if the Earth's distance from the Sun were always the same.
 - D) It makes summer warmer in the Northern Hemisphere than in the Southern Hemisphere.
- 18) Using the ideas discussed in your textbook, in what sense are we "star stuff"? 18) _____
- A) We could not survive without light from our star, the Sun.
 - B) Nearly every atom from which we are made was once inside of a star.
 - C) Movie stars and other people are all made of the same stuff, so we all have the potential to be famous.
 - D) The overall chemical composition of our bodies is about the same as that of stars.
- 19) For most of history, the lack of observable stellar parallax was interpreted to mean that _____. 19) _____
- A) Galileo's theories of the universe were essentially correct
 - B) Earth is stationary at the center of the universe
 - C) stars were too far away for parallax to be measured with available technology
 - D) stars must all lie at the same distance from Earth, on the celestial sphere
- 20) Suppose Earth's axis tilt was significantly greater than its current 23.5 degrees, but Earth's rotation period and orbital period were unchanged. Which statement below would *not* be true? 20) _____
- A) The region of Earth where the Sun does not rise on the winter solstice would be larger (extending farther south) than it is now.
 - B) Polaris would not be our North star.
 - C) The length of each season (for example, the number of days from the summer solstice to the fall equinox) would be significantly longer than it is now.
 - D) Summers and winters would be more severe (for example, hotter and colder, respectively) than they are now.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 21) Consider the following statement, and explain whether or not it is sensible: When I looked into the dark fissure of the Milky Way with my binoculars, I saw what must have been a cluster of distant galaxies. 21) _____
- 22) Suppose you lived on the Moon near the center of the face that we see from Earth. During the phase of full Moon, what phase would you see for Earth? Would it be day or night at your home? 22) _____
- 23) Starting from the Big Bang, briefly explain how our solar system came to contain the chemical elements necessary to make Earth and living organisms. 23) _____

- 24) What would you see if you were on the Moon during a solar eclipse? 24) _____
- 25) Consider the following statement, and explain whether or not it is sensible: If you lived on the Moon, you'd see full Earth when we see new Moon. 25) _____
- 26) Consider the following statement, and explain whether or not it is sensible: If you had a very fast spaceship, you could travel to the celestial sphere in about 100 years. 26) _____
- 27) Briefly explain why an expanding universe implies a beginning (called a Big Bang). 27) _____
- 28) Why is the Moon not completely invisible (it appears as a very deep red color) to the naked eye during a total lunar eclipse? 28) _____
- 29) If Earth's axis had no tilt, would we still have seasons? Why or why not? 29) _____
- 30) Briefly explain what we mean by the statement "The farther away we look in distance, the further back we look in time." 30) _____
- 31) Consider the following statement, and explain whether or not it is sensible: My sign is Ursa Major because the Sun was in Ursa Major when I was born. 31) _____
- 32) *Process of Science:* Your friend hypothesizes that the phases of the Moon are produced by Earth's shadow being cast on the Moon's surface. Devise an experiment to prove your friend wrong. Describe an observation you will make (time of day/night, location in sky) and describe what you will see that will clearly demonstrate that your friend's idea cannot be correct. 32) _____
- 33) Why does the Milky Way appear as a *band* of light in the sky? 33) _____
- 34) Consider the following statement, and explain whether or not it is sensible: Although all the known stars appear to rise in the east and set in the west, we might someday discover a star that will appear to rise in the west and set in the east. 34) _____
- 35) What would you see if you were on the Moon during a lunar eclipse? 35) _____