

TAKEN FROM HORIZONS 7TH EDITION CHAPTER 4 TUTORIAL QUIZ

1.

The Greek astronomer Hipparchus is noted for

- a. naming all of the stars.
- b. developing the concept of the light-year.
- c. recognizing and recording the constellations that we now observe in the sky.
- d. being the first great observational astronomer.

answer: d

2.

Which one of the following assumptions do astronomers use as they attempt to explain the universe?

- a. Effects can be unrelated to any cause.
- b. The force of gravity is caused by objects rotating or spinning.
- c. A object can exhibit a change in motion without a force being applied to it.
- d. Scientific laws are the same throughout the universe.

answer: d

3.

Kepler's role in destroying support for the geocentric theory was his discovery that

- a. the idea of planets moving in perfect circles was false.
- b. Jupiter has four satellites (moons) orbiting it.
- c. the planet Venus goes through phases just like the Moon.
- d. The Sun was not perfect, but exhibited sunspots.

answer: a

4.

The Ptolemaic system accepted by the Church at the time of Galileo could not explain

- a. Galileo's observation of the phases of the planet Venus.
- b. Galileo's discovery of parallax.
- c. the retrograde motions of the planets.
- d. the lunar phases.

answer: a

5.

In offering an alternative to the Earth-centered theory, Copernicus was motivated by

- a. the fact that the Ptolemaic system couldn't explain retrograde motion of the planets.
- b. the simplicity and elegance of the heliocentric theory.
- c. telescopic observations that revealed that the Sun and the Moon were not perfect.
- d. his discovery of three laws of motion that explained the orbits of the planets.

answer: b

6.

"The laws governing the behavior of objects on the Earth can be used to explain the behavior of objects in the sky." This statement is associated with the discoveries of

- a. Newton.
- b. Brahe.
- c. Galileo.
- d. Copernicus.

answer: a

7.

As a planet revolves around the Sun, its speed is greatest

- a. at the time of the winter solstice, when planets are closest to the Sun.
- b. at perihelion.
- c. at aphelion.
- d. none of these choices. The speed of a planet is constant.

answer: b

8.

The principle of parallax

- a. allows the astronomer to determine the amount of retrograde motion of a planet.
- b. was used by Galileo to argue for the heliocentric theory of Copernicus.
- c. was used by Kepler to determine the shapes of the orbits of the planets.
- d. allowed Tycho Brahe to determine that his 'new star' was indeed a star.

answer: d

9.

Tycho Brahe is important in the history of astronomy because he

- a. provided the precise observational data used by Kepler to discover the true shapes of planetary orbits.
- b. testified at the trial of Galileo, arguing that planets obey elliptical paths rather than circular paths.
- c. discovered the laws that govern the behavior of planets orbiting the Sun.
- d. was a strong supporter of the Copernican hypothesis that all the planets orbit around the Sun, not Earth.

answer: a

10.

Which of the following was NOT a telescopic observation of Galileo that threatened the geocentric system of Aristotle and Ptolemy adopted by the Church?

- a. Moons orbiting Jupiter, suggesting that Earth is not the only center of revolution.
- b. Blemishes (sunspots) on the Sun.
- c. Phases of Venus, something not possible in the geocentric theory.
- d. Parallax of some stars, suggesting that Earth orbits the Sun.

answer: d

11.

If the separation distance between two objects is tripled, the gravitational force between them

- a. decreases by a factor of 3.
- b. increases by a factor of 3.
- c. remains the same, as long as their masses do not change.
- d. decreases by a factor of 9.

answer: d

12.

When the Space Shuttle is launched into an Earth orbit high enough to avoid atmospheric drag, it

- a. is gravitationally attracted to the Moon, and will crash into it if reverse thrusters are not used.
- b. can orbit Earth forever.
- c. must occasionally fire its thrusters to prevent falling back to Earth.
- d. moves in a straight line away from Earth, so thrusters are fired to keep it from going away.

answer: b

13.

At the most basic level, the conflict between Galileo and the Church was disagreement over

- a. whether telescopes truly represent what is actually out in space.
- b. the source of true understanding: religious faith or use of observation and reason.
- c. whether the universe was eternal or evolving.
- d. what was at the center of the universe: Earth or the Sun.

answer: b

14.

Which of the following is a valid statement about Galileo?

- a. He invented the telescope.
- b. Galileo's verdict by the Inquisition was reversed with the discovery of planetary elliptical orbits by Kepler.
- c. Galileo's "crime" was that he insisted on using human observations to explain heaven's workings.
- d. He was condemned by the Inquisition for inventing the theory that Earth moves around the Sun.

answer: c

15.

As observed from Earth relative to stars, planets

- a. move around Earth from west to east at constant speed.
- b. usually move from west to east, but occasionally reverse direction for short periods of time.
- c. move around Earth from east to west at constant speed.
- d. usually move from east to west, but occasionally reverse direction for short periods of time.

answer: b

16.

Which of the following is NOT true regarding Kepler's Laws of Planetary Motion?

- a. The Laws were developed by Kepler prior to the condemnation and imprisonment of Galileo.
- b. A line from the Sun to a planet sweeps out equal areas in equal intervals of time.
- c. The square of a planet's orbital period around the Sun is proportional to its average distance from the Sun cubed.
- d. The force of attraction between the Sun and a planet depends on their masses, and inversely on the distance between them squared.

answer: d

17.

Copernicus offered a substitute to the geocentric theory because

- a. the Ptolemaic model of the universe did not accurately predict planetary positions.
- b. his telescopic observations revealed that the Sun and the Moon were not perfect.
- c. his three laws of motion showed that the shape of the orbits of the planets was elliptical.
- d. the Ptolemaic system couldn't explain why planets occasionally move backwards on the celestial sphere (retrograde motion).

answer: a

18.

Venus, at its brightest,

- a. is at closest approach to Earth.
- b. can be seen only just after sunset or just before sunrise.
- c. is at full phase.
- d. is the fourth brightest astronomical object in the sky.

answer: b

19.

What observational evidence did early classical astronomers offer in support of the claim that Earth did not spin?

- a. Parallax did not distort the shapes of the constellations.
- b. Stars and planets rise in the east and set in the west.
- c. They could not see Earth turning.
- d. All of these choices.

answer: a

20.

Copernicus's model of the universe was not readily accepted when first

proposed because

- a. all of these choices.
- b. to suddenly make the Sun the center of motion seemed too radical an idea.
- c. it did not predict planetary positions any more accurately than the Ptolemaic system.
- d. Earth's position was linked to the geometry of heaven and hell, an idea strongly held by the Church.

answer: a

21.

Tycho Brahe's careful measurement of the parallax of a "new star" led him to conclude that

- a. the entire universe is in a state of evolving, including Earth.
Therefore, Earth has no particular reason for being at the center.
- b. Earth orbits the Sun, rather than the other way around.
- c. The star must be outside Earth's atmosphere, beyond which Ptolemy believed to be eternal.
- d. Earth is not the center of the universe, since stars must not be eternal after all.

answer: c

22.

Assuming that a planet's average distance from the Sun is 5 AU, its orbital period must be

- a. 11 years.
- b. 125 years.
- c. 5 years.
- d. 25 years.

answer: a
