Chapter 22  Origin of Modern Astronomy

Section 22.2 The Earth-Moon-Sun System

This section describes how Earth moves in space and how changes in the relative positions of Earth, the sun, and the moon cause seasons, phases of the moon, and eclipses.

Reading Strategy

As you read, complete the flowchart to show how eclipses occur. For more information on this Reading Strategy, see the Reading and Study Skills in the Skills and Reference Handbook at the end of your textbook.

Motions of Earth

1. Circle the letter of the two main motions of Earth.
   a. rotation and precession  
   b. rotation and revolution
   c. revolution and precession  
   d. rotation and aphelion

2. Is the following sentence true or false? Day and night are caused by Earth’s revolution on its axis. ________false________

3. The point at which Earth is closest to the sun is called ______perihelion______.

4. Is the following sentence true or false? Seasons are caused in part by the tilt of Earth’s axis of rotation. ______true________

5. What is precession? Precession is a very slow change in the direction in which Earth’s axis points.

Motions of the Earth-Moon System

6. Circle the letter of the term that describes the point at which the moon is farthest from Earth.
   a. apogee   
   b. aphelion  
   c. perigee  
   d. perihelion
7. Identify each labeled phase on the figure as one of the following: waning gibbous, first quarter, waning crescent, waxing gibbous, new, waxing crescent, full, third quarter.

1. ______ new 4. ______ waxing gibbous 7. ______ third quarter
2. ______ waxing crescent 5. ______ full 8. ______ waning crescent
3. ______ first quarter 6. ______ waning gibbous

8. Lunar phases are caused by motions of the __________________ and the sunlight that is reflected from its surface.

9. Do the phases of the moon affect how much of the moon is illuminated? Explain your answer. The phases of the moon do not affect how much of the moon is illuminated because half of the moon is illuminated at all times. The phases only affect how much of the lit side an observer on Earth can see.

10. Is the following sentence true or false? The cycle of the phases takes about two days longer than the moon’s revolution around Earth. _______ true

11. List two reasons why the moon’s surface has extremely high and low temperatures. __________ long periods of daylight and darkness, absence of an atmosphere __________

**Eclipses**

12. A(n) _______ solar _______ eclipse occurs when the moon passes between Earth and the sun and casts a shadow on Earth.

13. Is the following sentence true or false? A lunar eclipse occurs when the moon passes into Earth’s shadow. _______ true

14. © What must happen in order for an eclipse to take place? The moon’s orbit must _______ cross the plane of the ecliptic during a new-moon or full-moon phase.

15. Who can see a total eclipse of the moon when it occurs? _______ Anyone on the side of Earth facing the moon can see a total eclipse. **