

## **Chapter 02 Patterns in the Sky**

### **Multiple Choice Questions**

1. The north-south line that passes directly overhead is the
- A. Ecliptic
  - B.** Meridian
  - C. Horizon
  - D. Azimuth

*Bloom's Level: Remember  
Figure: 2.4  
Section: 2.1*

2. Which of the following coordinates describes the angular distance of an object north or south of the celestial equator?
- A. Azimuth
  - B. Altitude
  - C. Right ascension
  - D.** Declination

*Bloom's Level: Remember  
Figure: 2.5  
Section: 2.1*

3. The celestial equivalent of latitude is
- A.** Declination
  - B. The horizon
  - C. Precession
  - D. Right ascension

*Bloom's Level: Remember  
Figure: 2.5  
Section: 2.1*

4. The line that divides the celestial sphere into northern and southern hemispheres is the
- A. Ecliptic
  - B. Celestial equator**
  - C. Meridian
  - D. Horizon

*Bloom's Level: Remember*

*Figure: 2.5*

*Section: 2.1*

5. Which of the following is true?
- A. A sidereal day is about 4 minutes shorter than a solar day on the Earth**
  - B. A sidereal day is about 4 minutes longer than a solar day on the Earth
  - C. A sidereal day is equal to a solar day on the Earth
  - D. A sidereal day is the same for all planets

*Bloom's Level: Understand*

*Figure: 2.17*

*Section: 2.2*

6. Suppose there is a star that rises at 10 p.m. tonight. At what time will it rise one month from now?
- A. 11 P.M.
  - B. Midnight
  - C. 9 p.m.
  - D. 8 p.m.**

*Bloom's Level: Apply*

*Section: 2.1*

7. Local noon corresponds to the time when the Sun is on the
- A. Zenith
  - B. Meridian**
  - C. Nadir
  - D. Ecliptic

*Bloom's Level: Understand*

*Figure: 2.5*

*Section: 2.1*

8. The Sun's path on the celestial sphere is the

- A. Zenith
- B. Equator
- C. Meridian
- D.** Ecliptic

*Bloom's Level: Analyze*

*Figure: 2.11*

*Section: 2.2*

9. What is the altitude of the Sun at noon on the day of the autumnal equinox at 41 degrees north latitude?

- A. 41 degrees
- B. 23 degrees
- C.** 49 degrees
- D. 18 degrees

*Bloom's Level: Apply*

*Figure: 2.11*

*Section: 2.2*

10. An observer in Sao Paulo, Brazil (latitude = 23.5 degrees) sees the Sun at the zenith at noon on which day(s)?

- A. Winter solstice (in December)
- B.** Summer solstice (in June)
- C. Spring and fall equinox
- D. Never, impossible

*Bloom's Level: Analyze*

*Figure: 2.11*

*Section: 2.2*

11. An observer at a latitude of 41 degrees sees the Sun at the zenith at noon on which day(s)?

- A. Summer and winter solstice
- B. Spring and fall equinox
- C. Never, impossible**
- D. Every day

*Bloom's Level: Analyze*

*Figure: 2.11*

*Section: 2.2*

12. The ecliptic is the

- A. Projection of the Earth's equator on the celestial sphere
- B. Plane of the Earth's orbit projected onto the celestial sphere**
- C. Apparent path of the Moon on the celestial sphere
- D. Plane of the Moon's orbit

*Bloom's Level: Understand*

*Figure: 2.11*

*Section: 2.2*

13. On the first day of Spring, the Sun is on the

- A. Zenith
- B. Meridian
- C. Celestial equator**
- D. Nadir

*Bloom's Level: Understand*

*Figure: 2.11*

*Section: 2.2*

14. The Sun moves eastward among the stars at the rate of about 30 degrees per
- A. Hour
  - B. Month**
  - C. Year
  - D. Day
  - E. Minute

*Bloom's Level: Analyze*  
*Figure: 2.12*  
*Section: 2.2*

15. The time kept by a sundial is
- A. Apparent solar time**
  - B. Mean solar time
  - C. Sidereal time
  - D. Greenwich mean time

*Bloom's Level: Understand*  
*Section: 2.2*

16. At which of the following times is the azimuth of the rising Sun the greatest for observers in the northern hemisphere?
- A. The winter solstice**
  - B. The summer solstice
  - C. The spring equinox
  - D. The autumnal equinox

*Bloom's Level: Understand*  
*Figure: 2.12*  
*Section: 2.2*

17. When does the most northerly sunrise occur?

- A. Autumnal equinox
- B. Vernal equinox
- C. Summer solstice**
- D. Winter solstice

*Bloom's Level: Understand*

*Figure: 2.12*

*Section: 2.2*

18. Approximately how long does it take for the Sun to move 1 degree with respect to the stars?

- A. 1 minute
- B. 1 hour
- C. 1 day**
- D. 1 week

*Bloom's Level: Understand*

*Figure: 2.10*

*Section: 2.2*

19. The occurrence of seasons on the Earth is due to the

- A. Earth being closer to the Sun in summer
- B. Earth changing its rotation rate during the year
- C. Earth's axis pointing in different directions during the year
- D. Earth's axis being inclined to the ecliptic**

*Bloom's Level: Analyze*

*Figure: 2.11*

*Section: 2.2*

20. If the Earth's equator were in the plane of the ecliptic, which of the following phenomena would not occur?

- A. Day and night
- B. The appearance of different constellations at different times of year
- C. The seasons
- D. The appearance of the planet Mercury in the sky

*Bloom's Level: Analyze*

*Figure: 2.11*

*Section: 2.2*

21. Approximately how rapidly does the Moon move eastward with respect to the stars?

- A. 12 degrees per day
- B. 1 degree per day
- C. 15 degrees per hour
- D. 1 degree per century

*Bloom's Level: Apply*

*Figure: 2.23*

*Section: 2.4*

22. At approximately what time does the new Moon set?

- A. Sunset
- B. Sunrise
- C. Noon
- D. Midnight

*Bloom's Level: Understand*

*Figure: 2.19*

*Section: 2.3*

23. Which of the following best describes the motion of the Moon?

- A. Toward the east with respect to the stars, westward across the sky
- B. Toward the east with respect to the stars, eastward across the sky
- C. Toward the west with respect to the stars, westward across the sky
- D. Toward the west with respect to the stars, eastward across the sky

*Bloom's Level: Analyze*

*Figure: 2.23*

*Section: 2.4*

24. When the Moon is at opposition, its phase is

- A.** Full
- B. New
- C. First quarter
- D. Third quarter

*Bloom's Level: Understand*

*Figure: 2.19*

*Section: 2.3*

25. The sidereal month is the time required for

- A. The Moon to go from new phase to new phase
- B. The Moon to orbit the Earth once with respect to the sun
- C.** The Moon to orbit the Earth once with respect to the stars
- D. A complete saros cycle

*Bloom's Level: Understand*

*Figure: 2.24*

*Section: 2.4*

26. Suppose the Moon rose at 6 p.m. yesterday. What are the approximate rising time and approximate phase of the Moon today?

- A. 5 p.m. and new
- B.** 5 p.m. and full
- C. 7 p.m. and new
- D. 7 p.m. and full

*Bloom's Level: Apply*

*Figure: 2.19*

*Section: 2.3*

27. If sunset is at 6:00 p.m., at what time does the waning quarter Moon rise?

- A. Noon
- B.** Midnight
- C. 3:00 a.m.
- D. 3:00 p.m.

*Bloom's Level: Apply*

*Figure: 2.19*

*Section: 2.3*

28. Relative to the stars, the Moon
- A. Remains stationary
  - B. Moves eastward, then westward during a month
  - C. Moves westward
  - D.** Moves eastward

*Bloom's Level: Understand*  
*Figure: 2.23*  
*Section: 2.4*

29. In which of the following circumstances is it possible to observe the first quarter Moon?
- A. Setting at noon
  - B. Rising at sunset
  - C. High in the sky at dawn
  - D.** Setting at midnight

*Bloom's Level: Apply*  
*Figure: 2.19*  
*Section: 2.3*

30. If the Moon is high in the sky at midnight, its phase is
- A. First quarter
  - B. New
  - C.** Full
  - D. Third quarter

*Bloom's Level: Apply*  
*Figure: 2.19*  
*Section: 2.3*

31. What is the phase of the Moon when it sets at dawn?
- A.** Full
  - B. New
  - C. First quarter
  - D. Third quarter

*Bloom's Level: Apply*  
*Figure: 2.19*  
*Section: 2.3*

32. During retrograde motion, the motion of a planet relative to the stars is generally
- A. Westward
  - B. Eastward
  - C. Northward
  - D. Southward

*Bloom's Level: Understand*  
*Figure: 2.27*  
*Section: 2.5*

33. Which of the following is true of the motion of the planet Mars among the stars?
- A. All retrograde loops occur in the same constellation.
  - B. All retrograde loops have the same shape.
  - C. Retrograde loops always are separated by the same interval of time.
  - D. Retrograde loops occur when Mars is in conjunction (near the Sun in the sky)

*Bloom's Level: Understand*  
*Figure: 2.28*  
*Section: 2.5*

34. The planet Jupiter has an orbital period of 12 years and a rotation period of 10 hours. Relative to the Earth, the difference between a solar and sidereal day is
- A. Much smaller for Jupiter
  - B. Much larger for Jupiter
  - C. Exactly the same as for Earth
  - D. Zero in the case of Jupiter

*Bloom's Level: Analyze*  
*Section: 2.2*

35. How does the planet Mars move with respect to the stars?
- A. Always eastward
  - B. Always westward
  - C. It stays in the same place at all times
  - D. Sometimes eastward, sometimes westward

*Bloom's Level: Understand*  
*Figure: 2.27*  
*Section: 2.5*

Chapter 02 - Patterns in the Sky

36. A last quarter moon
- A. sets as the sun rises
  - B. rises as the sun sets
  - C. sets 6 hours after sunset
  - D.** sets around noon

*Bloom's Level: Apply*

*Figure: 2.19*

*Section: 2.3*

37. If you measure the angle of the north star above the horizon, what position coordinate do you have?
- A. North longitude
  - B. South longitude
  - C.** North latitude
  - D. South latitude

*Bloom's Level: Analyze*

*Section: 2.1*

38. The sun reaches its highest high point in the sky at the beginning of which season?
- A. spring
  - B.** summer
  - C. winter
  - D. fall

*Bloom's Level: Understand*

*Figure: 2.11*

*Section: 2.2*

39. The daylight hours are the shortest at the beginning of what season?
- A. spring
  - B. summer
  - C. fall
  - D.** winter

*Bloom's Level: Understand*

*Figure: 2.11*

*Section: 2.2*