

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## **Stellar Reckoning: Can You Survive the 11th Grade Orbital Mechanics Challenge?**

Analyze celestial dynamics and gravitational perturbations to synthesize how Earth's specific orientation in the solar system influences global geophysical cycles.

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**1. The Milankovitch Theory suggests that long-term climate patterns are driven by orbital variations. Which term describes the 26,000-year cycle where Earth's axis traces a cone-like path in space?**

- A. Obliquity
- B. Eccentricity
- C. Axial Precession
- D. Apsidal Precession

**2. Due to the conservation of angular momentum, the Earth's rate of rotation is gradually decreasing caused by \_\_\_ friction from the Moon's gravity.**

- A. Magnetic
- B. Tidal
- C. Atmospheric
- D. Centrifugal

**3. True or False: If Earth's axial tilt (obliquity) were to increase to 24.5 degrees, the seasonal temperature extremes in mid-latitude regions would become more severe.**

- A. True
- B. False

**4. At the moment of the Boreal Summer Solstice, what is the solar declination (the latitude where the Sun is directly overhead at noon)?**

- A. 0° (Equator)
- B. 23.5° South (Tropic of Capricorn)
- C. 23.5° North (Tropic of Cancer)
- D. 66.5° North (Arctic Circle)

**5. The apparent shift in the position of nearby stars against the background of distant stars, used to calculate Earth's orbital displacement, is called stellar \_\_\_\_.**

- A. Aberration
- B. Parallax
- C. Redshift
- D. Magnitude

**6. True or False: The 'Barycenter' of the Earth-Moon system is located exactly halfway between the centers of the two bodies.**

- A. True

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B. False

**7. Kepler's Second Law (Law of Equal Areas) implies that Earth travels at its maximum orbital velocity during which event?**

- A. Aphelion (July)
- B. Perihelion (January)
- C. Vernal Equinox (March)
- D. Autumnal Equinox (September)

**8. The difference between a solar day (24 hours) and a/an \_\_\_\_ day (23 hours 56 minutes) is caused by Earth's simultaneous rotation and revolution.**

- A. Synodic
- B. Anomalistic
- C. Sidereal
- D. Tropical

**9. Which solar phenomenon is primarily responsible for the 'Maunder Minimum,' a period of significantly reduced solar activity that intersected with the Little Ice Age on Earth?**

- A. Coronal Mass Ejections
- B. Sunspot cycles
- C. Photospheric granules
- D. Solar spicules

**10. True or False: A Penumbral Lunar Eclipse occurs when the Moon passes entirely into the darkest, central part of the Earth's shadow.**

- A. True
- B. False