Name: _____ **Date:** _____

Cosmic Clues and Galactic Views: An 11th Grade Quiz

Examine redshift data and galactic morphology to assess understanding of the expanding universe and large-scale cosmic evolution.

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1. Which transition in the Balmer series of hydrogen is most commonly used by astronomers to calculate the cosmological redshift (z) of a distant galaxy?

A. H-Alpha line
B. Lyman-Alpha line
C. 21-cm Radio line
D. Gamma-ray bursts

2. According to the Hierarchical Model of galaxy formation, large elliptical galaxies are often the result of multiple mergers between smaller spiral galaxies.

A. True
B. False

3. The Sombrero Galaxy (M104) is unique because it exhibits characteristics of both spiral and elliptical structures. What is the primary feature defining its 'disk' component?

A. A central supermassive pulsar
B. An unusually thick dust lane
C. A lacks of globular clusters
D. A purely gaseous composition

4. The _____ Effect describes the process by which light from distant galaxies is distorted as it passes through the gravitational field of a massive foreground cluster.

A. Doppler
B. Photoelectric
C. Gravitational Lensing
D. Compton

5. Active Galactic Nuclei (AGN), such as Quasars, are powered by the accretion of matter onto stellar-mass black holes residing in the spiral arms.

A. True
B. False

6. Evidence for Dark Matter was famously provided by Vera Rubin, who observed that the _____ of spiral galaxies remained constant even at large distances from the center.

A. Luminosity
B. Rotation Curves
C. Chemical Abundance

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D. Magnetic Fields

7. The Great Attractor is a gravitational anomaly in intergalactic space that is currently pulling our Local Group and the Laniakea Supercluster toward it. Where is it located?

A. In the Boötes Void
B. Near the Zone of Avoidance
C. Inside the Andromeda Galaxy
D. At the edge of the CMB

8. Observations of Type Ia _____ in the late 1990s led to the Nobel-winning discovery that the expansion of the universe is accelerating due to dark energy.

A. Nebulae
B. Variable Stars
C. Supernovae
D. Quasars

9. The Cosmological Principle assumes that on a large enough scale, the universe is both homogeneous (the same in all places) and isotropic (the same in all directions).

A. True
B. False

10. What is the primary difference between a 'Seyfert Galaxy' and a standard spiral galaxy?

A. Total absence of gas and dust
B. A highly luminous, point-like core
C. The lack of any star-forming regions
D. A shape that is perfectly spherical