

Name: _____ Date: _____

Cosmic Command: Conquer this College Galactic Growth Quiz

Synthesize complex data on galactic nucleosynthesis, redline shifts, and dark matter halos to verify your mastery of large-scale cosmological evolution.

1. The 'Lyman-alpha forest' observed in the spectra of distant quasars provides primary evidence for which aspect of the intergalactic medium?

- A. The distribution of neutral hydrogen clouds in the early universe
- B. The absolute luminosity of Population III stellar clusters
- C. The metallic composition of the first elliptical galaxies
- D. The rotation curves of dark matter dominated dwarf galaxies

2. According to the hierarchical model of galaxy formation, large elliptical galaxies are primarily the result of _____.

- A. In-situ star formation from monolithic collapse
- B. Major mergers between smaller spiral galaxies
- C. The cooling of the intracluster medium
- D. Rapid rotation of the initial protogalactic cloud

3. The 'Baryon Tully-Fisher Relation' demonstrates a tight correlation between a spiral galaxy's total baryonic mass and its rotational velocity.

- A. True
- B. False

4. In the context of the cosmic distance ladder, Type Ia supernovae are uniquely valuable because they serve as 'standard candles.' This is due to which physical property?

- A. Their progenitor stars are always exactly 10 solar masses
- B. They occur only in the youngest star-forming regions
- C. The Chandrasekhar limit leads to a predictable peak luminosity
- D. Their light curves are unaffected by interstellar extinction

5. The 'Bottom-Up' theory of structure formation posits that large galaxy superclusters formed before individual stars and galaxies.

- A. True
- B. False

6. The unexpected flatness of galactic rotation curves at large radii provides physical evidence for the existence of _____.

- A. Supermassive Black Holes
- B. Dark Matter Halos
- C. Relativistic Jets

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D. Population II Stars

7. Quasars are most commonly found at high redshifts ($z > 2$). What does this imply about the evolution of the universe?

- A. Galaxy formation reached its peak in the very recent past
- B. Active Galactic Nuclei were more prevalent in the early universe
- C. Black holes only began forming 5 billion years ago
- D. The expansion of the universe is currently decelerating

8. The era in the early universe when the first stars re-ionized the surrounding neutral hydrogen gas is known as the _____.

- A. Recombination Epoch
- B. Epoch of Reionization
- C. Nucleosynthesis Era
- D. Planck Epoch

9. According to the Lambda-CDM model, Dark Energy currently accounts for approximately 68% of the total energy density of the universe.

- A. True
- B. False

10. What is the primary factor that prevents stars from forming in massive elliptical galaxies today?

- A. A total lack of gravitational potential
- B. The absence of dark matter within the galactic core
- C. AGN feedback and high-temperature virialized gas
- D. Extreme rotation speeds shearing apart molecular clouds