Optics in Space and Astronomy

Optics · Answer Key · 7 Questions

1. What optical phenomenon occurs when light from a distant galaxy is bent around a massive foreground galaxy or cluster due to gravity?

A) Gravitational lensing
B) Optical interference
C) Atmospheric scintillation
D) Diffractive scattering

2. According to optical principles in astronomy, what primary factor limits the maximum angular resolution of a telescope?

A) Length of the optical tube
B) Diameter of the primary lens or mirror
C) Magnification power of the eyepiece
D) Thickness of the mirror coating

3. Why do modern research observatories use reflecting telescopes with mirrors rather than refracting telescopes with glass lenses?

A) Lenses block high-energy radio waves
B) Mirrors eliminate gravitational lensing
C) Large lenses suffer from chromatic aberration and sag under weight
D) Mirrors completely prevent light diffraction

4. What optical technology uses real-time computer-controlled adjustments of deformable mirrors to correct atmospheric turbulence distortions?

A) Active interferometry
B) Adaptive optics
C) Spectrographic tuning
D) Coronagraphy

5. What optical effect causes stars to appear to twinkle when viewed from the surface of Earth?

A) Scintillation caused by atmospheric turbulence
B) Doppler shifting of starlight
C) Fluctuations in the star's nuclear fusion
D) Interstellar dust interference

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6. Which optical component is commonly used inside astronomical spectrographs to split incoming starlight into its individual wavelengths?

A) Polarizing filter
B) Diffraction grating
C) Beam splitter
D) Magnifying glass

7. What specialized telescope instrument optically blocks out the direct bright light of a star so faint surrounding objects can be detected?

A) Photometer
B) Coronagraph
C) Interferometer
D) Bolometer

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