

1. Galileo is credited with designing the first reflector telescope.
2. The simplest reflector telescope design is the prime focus reflector.
3. Chromatic aberration affects reflector telescopes.
4. All optical telescopes will bring the light from a star to a focus.
5. A telescope design that uses a lens and no mirrors is a refractor.
6. CCD detectors gather light 10-20 times faster than the most sensitive photographic film.
7. A Newtonian reflector needs no secondary mirror.
8. The Hubble Space Telescope gives us its best resolution with x-rays.
9. The Cassegrain reflector needs a primary concave main mirror and a smaller, convex secondary mirror to reflect light back through a hole in the primary.
10. Photography with film is still the preferred way of capturing fine detail in the faintest, most distant galaxies.
11. The light gathering ability of a telescope is most dependent on the diameter of its primary objective.
12. Mt. Palomar's 200" Hale telescope is the largest reflector now in service.
13. A telescope with an 8 inch mirror will collect twice as much light as one with a 4 inch mirror.
14. The 400" Keck reflector can see objects 100× fainter than the 40" Yerkes lens.
15. Radio telescopes have poor resolution compared to optical scopes, since radio waves have much longer wavelengths than optical ones.
16. All modern large optical telescopes are refractors.
17. Stars do not twinkle; the instability of the atmosphere causes this effect.
18. The opacity of the atmosphere is partially corrected via adaptive optics.
19. In the future, adaptive optics will greatly enhance the resolution of the Hubble Space Telescope.
20. Optical telescopes are usually used only at night, but radio telescopes can be used day or night.
21. The earth's atmosphere is the major factor limiting the resolution of ground-based radio telescopes.
22. Optical interferometry is more in use than radio interferometry.
23. Radio astronomy can only be done from up in space, due to our ionosphere.
24. Like radio and optical astronomy, infrared astronomy is easily done with ground-based telescopes.
25. Due to our ozone layer, ultraviolet astronomy is best done above the atmosphere.
26. The mirrors for x-ray telescopes are the same shape as those of optical reflectors.
27. The Compton GRO was the first telescope used for our exploration of high energy astronomy.
28. Galaxies look the same whether viewed in visible or x-ray wavelengths.
29. Which type of telescope has the simplest light path?
 - A) prime focus reflector
 - B) achromatic refractor
 - C) Newtonian reflector
 - D) single lens refractor
 - E) Cassegrain reflector
30. Which type of telescope did Galileo turn skyward in 1610?
 - A) single lens refractor
 - B) achromatic refractor
 - C) Cassegrain reflector
 - D) Newtonian reflector
 - E) prime focus reflector
31. What problem do refractor telescopes have that reflectors don't?
 - A) diffraction limited resolution
 - B) bad seeing
 - C) chromatic aberration
 - D) spherical aberration
 - E) light loss from secondary elements
32. The most important advantage of CCDs over film is that
 - A) their images do not have to be developed as film does.
 - B) they record much more light in a given exposure time.
 - C) their images never fade, as film can.
 - D) they record colors better than film can.
 - E) they can cover larger areas of the sky than film can.
33. The primary purpose of a telescope is to
 - A) separate light into its component wavelengths
 - B) make distant objects appear nearby
 - C) measure the brightness of stars very accurately
 - D) magnify distant objects
 - E) collect a large amount of light and bring it into focus

34. A major advantage of a Newtonian reflector over a refractor is
- A) the central hole in the mirror is smaller.
 - B) there are only two lenses to grind.
 - C) the elimination of the secondary mirror.
 - D) the elimination of chromatic aberration.
 - E) its compact size.
35. Adding a secondary concave lens of carefully chosen different glass to the primary lens on a refractor allows
- A) effects of atmospheric turbulence to be reduced.
 - B) more light to be gathered.
 - C) chromatic aberration to be reduced.
 - D) x-rays to be focused.
 - E) greater magnification.
36. It is diffraction that limits the ___ of a telescope's objective.
- A) magnification
 - B) frequencies
 - C) wavelengths
 - D) light grasp
 - E) resolution
37. The angular resolution of an 8 inch diameter telescope is ___ greater than that of a 2 inch diameter telescope.
- A) 2×
 - B) 4×
 - C) 8×
 - D) 9×
 - E) 16×
38. The amount of diffraction and thus the resolution of the scope depends upon
- A) whether the telescope is a reflector or refractor.
 - B) the size and sensitivity of the CCD chip used for imaging.
 - C) the design of the telescope.
 - D) the brightness of the object.
 - E) the wavelength used and the size of the main telescope objective lens or mirror.
39. What is the resolution of a telescope?
- A) its ability to separate light into its component colors for analysis
 - B) its ability to make distant objects appear much closer to us
 - C) its ability to see very faint objects
 - D) its ability to distinguish two adjacent objects close together in the sky
 - E) its ability to focus more than just visible light for imaging
40. Compared to a 5 inch prime focus reflector, a 5 inch Newtonian reflector will
- A) will have more chromatic aberration.
 - B) have the same light gathering power.
 - C) will have a larger hole in the center of its mirror.
 - D) have more light gathering power.
 - E) be easier to build.
41. What is the light-gathering power of an 8 inch telescope compared to a 4 inch telescope?
- A) 2× better
 - B) 4× better
 - C) 8× better
 - D) 16× better
 - E) 32× better
42. Green light has a shorter wavelength than orange light. In a 5 inch telescope, green light will
- A) allow dimmer stars to be observed.
 - B) reduce the effects of atmospheric turbulence.
 - C) come to the same exact focus as orange light.
 - D) provide worse angular resolution than orange light.
 - E) provide better angular resolution than orange light.
43. What problem does adaptive optics correct?
- A) defects in the optics of the telescope, such as the original Hubble mirror
 - B) the opacity of the earth's atmosphere to some wavelengths of light
 - C) turbulence in the earth's atmosphere which creates twinkling
 - D) chromatic aberration due to use of only a single lens objective
 - E) the light pollution of urban areas
44. What is true of radio telescopes?
- A) They have better angular resolution than a reflector.
 - B) They are the smallest, most compact telescopes.
 - C) They can only be used above the atmosphere.
 - D) They are most sensitive to the opacity of the ozone layer.
 - E) They have poorer angular resolution than a refractor.
45. The Arecibo radio telescope is laid out like which optical telescope design?
- A) Cassegrain reflector
 - B) prime focus reflector
 - C) Newtonian reflector
 - D) Coude reflector
 - E) grazing incidence reflector
46. In astronomy, an interferometer can be used to
- A) speed up the processing of CCD images
 - B) yield better seeing conditions with optical telescopes
 - C) improve the angular resolution of radio telescopes
 - D) decrease the effects of light pollution in getting darker sky backgrounds
 - E) increase the sensitivity of infrared telescopes to longer wavelengths

47. Compared to optical telescopes, radio telescopes are built large because
- A) radio sources are harder to find.
 - B) radio photons don't carry much energy.
 - C) atmospheric turbulence is more of a problem.
 - D) they're less expensive to make than optical telescopes.
 - E) radio waves are absorbed by the atmosphere.
48. One advantage of the Hubble Space telescope over ground based ones is that
- A) it is larger than any Earth-based scopes.
 - B) its adaptive optics controls atmospheric blurring better.
 - C) it can make better observations of the ozone layer.
 - D) in orbit, it can operate close to its diffraction limit at visible wavelengths.
 - E) it can better focus x-ray images.
49. The design of modern x-ray telescopes depends on
- A) grazing incidence optics.
 - B) the Cassegrain design, with mirrors made of lead.
 - C) achromatic lenses to keep the x-rays in focus
 - D) the prime focus design, with mirrors made of iron.
 - E) lenses made of germanium.
50. Which of the following is currently supplying high resolution x-ray images from space?
- A) HEAO-2
 - B) COBE
 - C) Chandra
 - D) ROSAT
 - E) Einstein