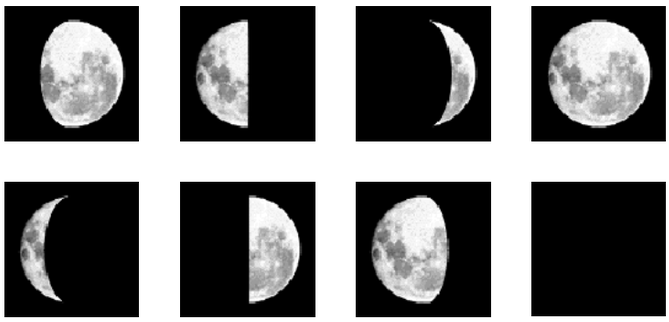
Closed book, closed notes. Clearly circle ("O") the one choice that you think is most definitely correct. Cross out ("×") only one choice that you think is definitely incorrect.

1. [4.0 points.] In December, an observer in San Luis Obispo, CA will watch the sun rising on the horizon at a point:
(A) between northeast and east.
(B) due east.
(C) between east and southeast.
(D) between southwest and west.
(E) due west.
(F) between west and northwest.

2. [4.0 points.] What time is it when the waning crescent moon is setting?
(A) 12:00 PM (noon).
(B) 3:00 PM (afternoon).
(C) 6:00 PM (sunset).
(D) 9:00 PM (evening).
(E) 12:00 AM (midnight).
(F) 3:00 AM (wee hours).
(G) 6:00 AM (sunrise).
(H) 9:00 AM (morning).

3. [4.0 points.] Which phase will the moon have when it is overhead at 9:00 AM? Clearly circle your answer below.



4. [4.0 points.] A total lunar eclipse will be visible for observers in San Luis Obispo, CA on May 26, 2021.[1] During this total lunar eclipse, the moon will be located in:
(A) Earth's umbra.
(B) Earth's penumbra.
(C) Earth's negative shadow.
(D) (none of Earth's shadow zones.)

5. [4.0 points.] _____ explained the prograde and retrograde motion of a planet by having it move on a circle that itself moves around Earth.
(A) Aristotle.
(B) Ptolemy.
(C) Copernicus.
(D) Tycho.
(E) Kepler.
(F) Galileo.
(G) Newton.

Questions (6)-(10) are continued on the back of this page.

[1] timeanddate.com/eclipse/lunar/2021-may-26.

Name (last, first):

4-digit PIN:

Quiz 3

Closed book, closed notes. Clearly circle ("O") the one choice that you think is most definitely correct. Cross out ("×") only one choice that you think is definitely incorrect.

This quiz continues from questions (1)-(5) on the other side of this page.

For questions (6)-(8), the two far-infrared reflector telescopes of the Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII)[2] have the same 0.50 m (1.6 ft) diameter, and are separated by a distance of 8.0 m (26 ft) between them. This telescope system is attached to a balloon that ascends to an altitude of 40 km (25 miles) in the upper atmosphere.[3]

6. [4.0 points.] Taking this far-infrared telescope system into the upper atmosphere improves the light-gathering power due to less _____ at high altitudes.
(A) absorption.
(B) turbulence.
(C) light pollution.
(D) temperature fluctuations.

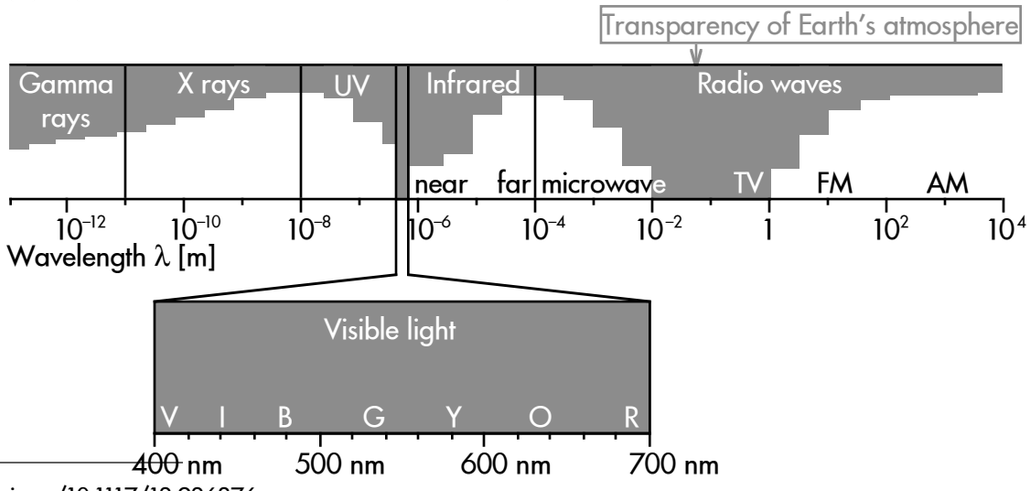
7. [4.0 points.] If each of these far-infrared telescopes had been constructed with larger diameters, this would have increased the telescope system's overall:
(A) light-gathering power.
(B) resolving power.
(C) magnifying power.
(D) (Two of the above choices.)
(E) (All of the above choices.)
(F) (None of the above choices.)

8. [4.0 points.] If the two mirrors of this far-infrared telescope system were instead combined into a single mirror with the same total surface area, the resolving power would:
(A) decrease.
(B) remain the same.
(C) increase.
(D) (The telescope would no longer be able to function.)

---

9. [4.0 points.] Adaptive optics is used in modern optical telescopes to improve:
(A) light-gathering power.
(B) resolving power.
(C) magnifying power.
(D) the amount of radiation transmitted through the atmosphere.

10. [4.0 points.] The magnifying power of an optical telescope depends on the:
(A) focal length of the primary lens/mirror.
(B) focal length of the eyepiece.
(C) diameter of the primary lens/mirror.
(D) diameter of the eyepiece.
(E) (More than one of the above choices.)



[2] dx.doi.org/10.1117/12.926376.
[3] asd.gsfc.nasa.gov/bettii/.