

AP B webreview ch 23 lenses and mirrors**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. When the reflection of an object is seen in a plane mirror, the distance from the mirror to the image depends on:
- the wavelength of light used for viewing.
 - the distance from the object to the mirror.
 - the distance of both the observer and the object to the mirror.
 - the size of the object.
 - the size of the mirror.
- _____ 2. The lateral magnification for a flat mirror:
- is a function of the object distance.
 - is a function of the image distance.
 - is a function of the object and image distance.
 - is 1.
 - is -1 .
- _____ 3. How large should a wall-mounted mirror be to view the upper half of ones height, h ?
- h
 - $h/2$
 - $h/4$
 - $h/3$
 - The answer is not given.
- _____ 4. If a virtual image is formed along the principal axis 10 cm from a concave mirror with the focal length 15 cm, what is the object distance from the mirror?
- 30 cm
 - 10 cm
 - 12 cm
 - 6.0 cm
 - 4.4 cm
- _____ 5. A woman looking in a makeup mirror sees her face at twice its actual size and right-side up. If she is 28.0 cm from the mirror, what is its focal length?
- 18.6 cm
 - 44.0 cm
 - 48.3 cm
 - 56.0 cm
 - 66.2 cm
- _____ 6. Which of the following best describes the image of a concave mirror when the object is at a distance greater than twice the focal point distance from the mirror?
- virtual, upright and magnification greater than one
 - real, inverted and magnification less than one
 - virtual, upright and magnification less than one
 - real, inverted and magnification greater than one
 - real, upright and magnification less than one

- _____ 7. A convex mirror with a focal length of -20 cm forms an image 15 cm behind the surface. If the object height is 1.2 cm what is the image height?
- 0.30 cm
 - 0.75 cm
 - 0.94 cm
 - 3.0 cm
 - 6.7 cm
- _____ 8. An object placed 12 cm from a concave mirror produces a real image 8.0 cm from the mirror. If the object is now moved to a new position 18.0 cm from the mirror, where is the new image located as measured from the mirror?
- 3.0 cm
 - 6.5 cm
 - 9.2 cm
 - 14.6 cm
 - 17.1 cm
- _____ 9. When the reflection of an object is seen in a convex mirror the image will:
- always be real.
 - always be virtual.
 - may be either real or virtual.
 - will always be enlarged.
 - will always be inverse.
- _____ 10. A girl is standing in front of a concave mirror. Consider two rays of light, one from her nose and one from her mouth that are parallel as they are traveling toward the mirror. These rays will come together:
- at the focal point.
 - at the center of curvature.
 - at the image point.
 - behind the mirror if she is too close to the mirror.
 - at a point half way to the focal point.
- _____ 11. An object 2 cm high is placed 10 cm in front of a mirror. What type of mirror and what radius of curvature is needed for an image that is upright and 4 cm tall?
- Concave, $R = 20$ cm
 - Concave, $R = 40$ cm
 - Convex, $R = -10$ cm
 - Convex, $R = -20$ cm
 - Convex, $R = -40$ cm
- _____ 12. An object is 12.0 cm from the surface of a spherical Christmas tree ornament that is 8.00 cm in diameter. What is the magnification of the image?
- -0.200
 - -0.500
 - $+0.143$
 - $+0.250$
 - $+0.500$

- _____ 13. An object is placed 10 cm in front of a mirror and an image is formed that has a magnification of 2. Which of the following statements is true?
- The focal length of the mirror is 30 cm.
 - The image is real.
 - There is not enough information to select the correct answer.
 - This is the only true statement.
 - There is more than one true statement.
- _____ 14. An object is placed 10 cm in front of a mirror and an image is formed that has a magnification of 2. Which of the following statements is false?
- The focal length of the mirror is 20 cm.
 - The image is virtual.
 - There is enough information to select the correct answer.
 - This is the only true statement.
 - All statements except d are true.
- _____ 15. A solid glass sphere with a radius of 5.00 cm and index of refraction of 1.52 has a small coin embedded 3.00 cm from the front surface of the sphere. For the viewer looking at the coin through the glass, at what distance from the front surface of the glass does the coin's image appear to be located?
- 2.48 cm
 - 3.20 cm
 - 5.00 cm
 - 6.85 cm
 - 7.55 cm
- _____ 16. Atmospheric refraction of light rays is responsible for:
- spherical aberration.
 - mirages.
 - chromatic aberration.
 - light scattering.
 - sun-spots.
- _____ 17. If atmospheric refraction did not occur, how would the apparent time of sunrise and sunset be changed?
- Both would be later.
 - Both would be earlier.
 - Sunrise would be later and sunset earlier.
 - Sunrise would be earlier and sunset later.
 - Both would be the same
- _____ 18. A 3.0 cm tall object is placed along the principal axis of a thin convex lens of 30.0 cm focal length. If the object distance is 40.0 cm, which of the following best describes the image distance and height, respectively?
- 17.3 cm and 7.0 cm
 - 120 cm and 9.0 cm
 - 17.3 cm and 1.3 cm
 - 120 cm and 1.0 cm
 - 17.3 cm and 9.0 cm

- _____ 19. Sally places an object 6.0 cm from a thin convex lens along its axis. The lens has a focal length of 9.0 cm. What are the respective values of the image distance and magnification?
- 18 cm and 3.0
 - 18 cm and 3.0
 - 3.0 cm and -0.50
 - 18 cm and -3.0
 - 18 cm and -0.50
- _____ 20. An object is placed at a distance of 50 cm from a thin lens along the axis. If a real image forms at a distance of 40 cm from the lens, on the opposite side from the object, what is the focal length of the lens?
- 22 cm
 - 45 cm
 - 90 cm
 - 200 cm
 - 260 cm
- _____ 21. Two thin lenses with focal lengths 25.0 cm and 30.0 cm are placed in contact in an orientation so that their optic axes coincide. What is the focal length of the two in combination? Hint: A thin lens is one whose thickness is negligible.
- 13.6 cm
 - 27.5 cm
 - 55.0 cm
 - 150 cm
 - 175 cm
- _____ 22. Two thin lenses, with focal lengths of 25.0 cm and -30.0 cm are placed in contact in an orientation so that their optic axes coincide. What is the focal length of the two in combination? Hint: A thin lens is one whose thickness is negligible.
- 5.0 cm
 - 13.6 cm
 - 55.5 cm
 - 150 cm
 - 200 cm
- _____ 23. For a converging lens with two curved surfaces, the radius of curvature for both surfaces is 10 cm. If the focal length is 10 cm, what must the index of refraction be?
- 1.5
 - 2.0
 - 2.5
 - 3.0
 - 3.5
- _____ 24. A converging lens with two convex surfaces has a front surface with radius of curvature of 10.0 cm; the back surface has radius of curvature of 20.0 cm and it is made from material with an index of refraction of 2.50. What is the focal length of the lens?
- 4.44 cm
 - 13.3 cm
 - 13.3 cm
 - 0.250 cm
 - 4.44 cm

- _____ 25. When an image is inverted compared to the object, it is also:
- virtual.
 - reversed left to right.
 - enlarged.
 - diminished.
 - None of the above statements is true.
- _____ 26. Three thin lenses, each of focal length f , are placed in contact. What is the resulting focal length of the combination?
- f
 - $3f$
 - $f/3$
 - $3/f$
 - $(3f)^{-1}$
- _____ 27. An object is placed 25 cm to the left of a lens of focal length 20 cm. 75 cm to the right of this lens is a plane mirror. Where does the final image form?
- 25 cm to the right of the mirror
 - 25 cm to the left of the mirror
 - 50 cm to the left of the lens
 - 100 cm to the left of the lens
 - 150 cm to the left of the lens
- _____ 28. Which of the following effects is the result of the fact that the index of refraction of glass will vary with wavelength?
- spherical aberration
 - mirages
 - chromatic aberration
 - light scattering
 - light polarization

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Answer Section

MULTIPLE CHOICE

1. B
2. D
3. C
4. D
5. D
6. B
7. A
8. B
9. B
10. A
11. B
12. C
13. D
14. D
15. A
16. B
17. C
18. B
19. A
20. A
21. A
22. D
23. A
24. A
25. B
26. C
27. C
28. C