Name: _____ **Class:** _____ **Date:** _____ **ID: A**

AP Physics 2 - Chapter 23 Practice

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

____ 1. A concave mirror has a focal length of 20 cm. What is the position (in cm) of the resulting image if the image is inverted and four times smaller than the object?
a. 15 b. 25 c. 50 d. 100 e. −15

____ 2. A convex mirror has a focal length of 20 cm. What is the position of the resulting image (in cm) if the image is upright and four times smaller than the object?
a. −100 b. −25 c. −50 d. −15 e. −10

____ 3. A concave mirror has a radius of curvature of 1.0 m. An object is placed 2.0 m in front of the mirror. Determine the location of the image (in cm).
a. 130 b. 83 c. 67 d. 150 e. 200

____ 4. An object 4 cm high is placed 15 cm in front of a convex mirror with a focal length of 10 cm. What is the image position (in cm)?
a. −8 b. −4 c. −2 d. −6 e. 30

____ 5. An object 15 cm high is placed 15 cm in front of a convex mirror with a focal length of 10 cm. What is the image height (in cm)?
a. 2 b. 4 c. 6 d. 8 e. 30

____ 6. An object is placed 15 cm in front of a concave mirror with a focal length of 30 cm. What is the magnification?
a. 1 b. 2 c. 1/2 d. 1/4 e. −2

____ 7. The actual depth of a shallow pool 1.00 m deep is not the same as the apparent depth seen when you look straight down at the pool from above. How deep (in cm) will it appear to be? (n_{water} = 1.33.)
a. 133 b. 75.2 c. 90.6 d. 117 e. 100

____ 8. An object 20-cm high is placed 50.0 cm in front of a lens whose focal length is 5.00 cm. Where will the image be located (in cm)?
a. 5.13 b. 5.56 c. 5.72 d. 5.93 e. 4.55

____ 9. An object 50-cm high is placed 1.0 m in front of a converging lens whose focal length is 1.5 m. Determine the image height (in cm).
a. 77 b. 150 c. 52 d. 17 e. 83

____ 10. An object is placed 15 cm in front of a diverging lens whose focal length is 12 cm. Where will the image be located (in cm)?
a. −6.7 b. −7.2 c. −0.15 d. −60 e. −5.0

____ 11. A compound microscope is made with an objective lens (f_o = 0.90 cm) and an eyepiece (f_e = 1.1 cm). The lenses are separated by a distance of 10 cm. If an object is 1.0 cm in front of the objective lens, where will the final image of the eyepiece be located?
a. −30 b. −15 c. −23 d. −11 e. −9

____ 12. If you stand *closer* to a concave mirror than a distance of one focal length, the image you see is
a. real and inverted. c. virtual and inverted. e. none image
b. real and upright. d. virtual and upright.

____ 13. When you stand in front of a convex mirror, the image you see is
a. real and inverted. c. virtual and inverted. e. not enough info
b. real and upright. d. virtual and upright.

____ 14. The image of an object beneath the surface of a medium of refractive index $n > 1$ is seen in air by a person looking down on the surface. This image, formed by light rays leaving the flat refractive surface, is
a. real and closer to the viewer than the object.
b. virtual and closer to the viewer than the object.
c. real and farther from the viewer than the object.
d. virtual and farther from the viewer than the object.
e. virtual and the same distance from the viewer as the object.

____ 15. The inhabitants of a planet in another galaxy have their eyes at the exact center of their 4.0-m long bodies. How long must a plane mirror be for such a creature to be able to see all of its body in the mirror?
a. 1.0 m b. 2.0 m c. 2.5 m d. 4.0 m e. 8.0 m

____ 16. An object is placed a distance $y_0 = -2f$ in front of a convex lens of focal length f that is located at $y = 0$. An identical object is placed a distance $y_0' = -2f$ in front of a concave lens of focal length $-f$ that is located at $y' = 0$. The difference between the two image positions, $y_i - y_i'$, is
a. $\frac{f}{2}$. b. f. c. $\frac{4}{3}f$. d. $2f$. e. $\frac{8}{3}f$.

____ 17. An object is placed a distance $y_0 = -2f$ in front of a concave mirror of focal length f that is located at $y = 0$. An identical object is placed a distance $y_0' = -2f$ in front of a convex mirror of focal length $-f$ that is located at $y' = 0$. The difference between the two image positions, $y_i - y_i'$, is
a. $\frac{f}{2}$. b. f. c. $\frac{4}{3}f$. d. $2f$. e. $\frac{8}{3}f$.

____ 18. A fish is 80 cm below the surface of a pond. What is the apparent depth (in cm) when viewed from a position almost directly above the fish? (For water, $n = 1.33$.)
a. 50 b. 60 c. 40 d. 70 e. 110

____ 19. An object is placed 25 cm in front of a lens of focal length 20 cm. 60 cm past the first lens is a second lens of focal length 25 cm. How far past the 25 cm lens does the final image form?
a. 20 cm b. 40 cm c. 16 cm d. 25 cm e. 47 cm

____ 20. An object is placed 25 cm in front of a lens of focal length 20 cm. 60 cm past the first lens is a second lens of focal length 25 cm. What is the resulting magnification of the object in this setup?
a. –1.6 b. +8.0 c. –8.0 d. +1.4 e. –1.2

AP Physics 2 - Chapter 23 Practice
Answer Section

MULTIPLE CHOICE

1. B
2. D
3. C
4. D
5. C
6. B
7. B
8. B
9. B
10. A
11. D
12. D
13. D
14. B
15. B
16. E
17. E
18. B
19. C
20. A