Standardized Test Prep

MULTIPLE CHOICE

1. In the equations for interference, what does the term d represent?

A. the distance from the midpoint between the two slits to the viewing screen

B. the distance between the two slits through which a light wave passes

C. the distance between two bright interference fringes

D. the distance between two dark interference fringes

2. Which of the following must be true for two waves with identical amplitudes and wavelengths to undergo complete destructive interference?

F. The waves must be in phase at all times.

G. The waves must be 90° out of phase at all times.

H. The waves must be 180° out of phase at all times.

J. The waves must be 270° out of phase at all times.

3. Which equation correctly describes the condition for observing the third dark fringe in an interference pattern?

A. $d\sin\theta = \lambda/2$

B. $d\sin\theta = 3\lambda/2$

C. $d\sin\theta = 5\lambda/2$

D. $d\sin\theta = 3\lambda$

4. Why is the diffraction of sound easier to observe than the diffraction of visible light?

F. Sound waves are easier to detect than visible light waves.

G. Sound waves have longer wavelengths than visible light waves and so bend more around barriers.

H. Sound waves are longitudinal waves, which diffract more than transverse waves.

J. Sound waves have greater amplitude than visible light waves.

5. Monochromatic infrared waves with a wavelength of 750 nm pass through two narrow slits. If the slits are 25 μm apart, at what angle will the fourth-order bright fringe appear on a viewing screen?

A. 4.3°

B. 6.0°

C. 6.9°

D. 7.8°

6. Monochromatic light with a wavelength of 640 nm passes through a diffraction grating that has 5.0×10^4 lines/m. A bright line on a screen appears at an angle of 11.1° from the central bright fringe. What is the order of this bright line?

F. $m = 2$

G. $m = 4$

H. $m = 6$

J. $m = 8$

7. For observing the same object, how many times better is the resolution of the telescope shown on the left in the figure below than that of the telescope shown on the right?

A. 4

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{4}$