AP Physics 2 Algebra Based : Unit - 6 - Geometric and Physical Optics Practice Test

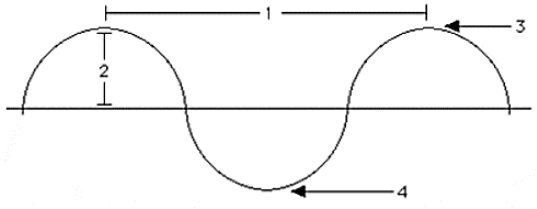
Question 1
Which one of the following statements concerning electromagnetic waves is false?

A. The existence of electromagnetic waves was predicted by Maxwell.
B. Electromagnetic waves can propagate through a material substance.
C. Electromagnetic waves are longitudinal waves.
D. Electromagnetic waves transfer energy through space.

Question 2
What is the general term for determining the position of an object by reflecting sound off?

A. Echolocation
B. Beats
C. Resonance
D. Reverberation

Question 3
Which is the wavelength?



A. 1
B. 2
C. 3
D. 4

Question 4
Wave interference is _____ when the amplitudes of the waves add together to make a larger wave overall, while it is _____ when the amplitudes of the waves work against one another to make a smaller wave overall.

A. Constructive… Destructive
B. Refractive… Constructive
C. Diffusive… Destructive
D. Destructive… Constructive

Question 5
Waves moves _____ through vibrations.

A. Mass
B. Weight
C. Matter
D. Energy

Question 6

A motorcycle is receding at 15 $\frac{m}{s}$. Normally, the exhaust note has frequency 105Hz. Determine the perceived frequency if the speed of sound is 340.9 $\frac{m}{s}$.

A. $f_{observed} = 95.5\ Hz$
B. $f_{observed} = 100.6\ Hz$
C. $f_{observed} = 120\ Hz$
D. $f_{observed} = 93.1\ Hz$

Question 7

Which of the following is not an example of observed periodic motion?

A. A playground swing
B. Ocean waves
C. A car driving down a straight road
D. The rotation of a wheel

Question 8

A 4.00-cm tall light bulb is placed a distance of 45.7 cm from a concave mirror having a focal length of 15.2 cm. Determine the image distance.

A. $d_i = 2.35\,cm$
B. $d_i = 1.99\,cm$
C. $d_i = 3.12\,cm$
D. $d_i = 0.895\,cm$

Question 9

Determine the focal length of a convex mirror that produces an image that is 16.0 cm behind the mirror when the object is 28.5 cm from the mirror.

A. $f = -42.4\,cm$
B. $f = -38.7\,cm$
C. $f = -41.5\,cm$
D. $f = -36.6\,cm$

Question 10

When the frequency of a wave increases, what happens to the wavelength?

A. The wavelength increases
B. The wavelength decreases
C. The wavelength is not directly affected by the frequency of a wave
D. None of the above

Question 11

Determine the frequency of light of wavelength 461 nm.

A. $6.51\,x\,10^{15}\,Hz$
B. $4.17\,x\,10^{15}\,Hz$
C. $3.25\,x\,10^{15}\,Hz$
D. $1.18\,x\,10^{15}\,Hz$

Question 12
The EM wave with frequency higher than infrared and lower than UV.
A. X-ray
B. Radio
C. Gamma
D. Visible light

Question 13
A 4.0-cm tall wood is placed a distance of 8.3 cm from a concave mirror having a focal length of 15.2 cm. Determine the image size.
A. $h_i = 4.1\,cm$
B. $h_i = 7.8\,cm$
C. $h_i = 8.8\,cm$
D. $h_i = 6.3\,cm$

Question 14
Through which medium will sound waves travel the fastest?
A. Air
B. Iron metal
C. Water
D. The vacuum of outer space

Question 15
A 4.0-cm tall candle is placed a distance of 35.5 cm from a convex mirror having a focal length of -12.2 cm. Determine the image distance.
A. $d_i = -7.58\,cm$
B. $d_i = -6.89\,cm$
C. $d_i = -11.042\,cm$
D. $d_i = -9.08\,cm$

Question 16
A light ray is passing through water (n=1.33) towards the boundary with a transparent solid at an angle of 56.4°. The light refracts into the solid at an angle of refraction of 42.1°. Determine the index of refraction of the unknown solid.
A. 1.65
B. 1.24
C. 1.13
D. 1.05

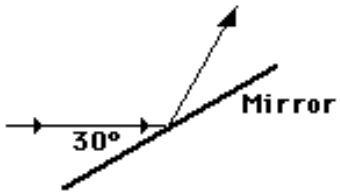
Question 17

How are EM waves different from Mechanical waves?

A. EM waves need a medium
B. Mechanical waves transfer matter
C. Mechanical wave needs a medium
D. EM waves can travel through empty space only

Question 18

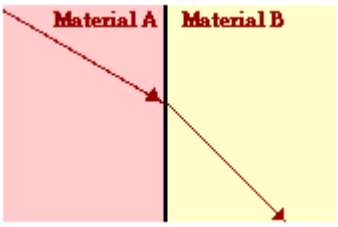
A ray of light is incident towards a plane mirror at an angle of 30-degrees with the mirror surface. What will be the angle of reflection?



A. 15°
B. 60°
C. 50°
D. 30°

Question 19

A light ray is traveling through crown glass (n = 1.52) and approaching the boundary with water (n = 1.33) as shown in the diagram at the right. Calculate the angle of refraction of the light ray as it enters into the water.



A. 45°
B. 15°
C. 60°
D. 90°

Answer Key

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