

Chapt. 13

1. A 0.4-kg object, suspended from a spring with a spring constant of $k = 10 \text{ N/m}$, is moving in simple harmonic motion and has an amplitude of 0.08 m. What is its kinetic energy at the instant when its displacement is 0.04 m? .24J
2. The tension in a guitar string is increased by a factor of two. By what factor does the wave velocity change? $1.4v$
3. A 0.6-kg mass hangs from a spring ($k = 80 \text{ N/m}$), and is set into an up-and-down simple harmonic motion. What is the potential energy stored in the spring alone when the mass is displaced 0.1 m? .4J
4. A radio wave has a speed of $3 \times 10^8 \text{ m/s}$ and a frequency of 101 MHz. What is its wavelength? 2.97m

Ch. 14

5. A series of ocean waves, each 10.0 m from crest to crest, moving past the observer at a rate of 2 waves per second, have what velocity? 20m/s

6. A standing wave is set up in a 2.0-m length string fixed at both ends. The string vibrates in 4 distinct segments when driven by a 120 Hz source. What is the wave velocity in this string? 120 m/s
7. If a sound source with a 2000 Hz frequency is at rest, and a listener moves at a speed of 30.0 m/s away from the source, what is the apparent frequency heard by the listener? (The velocity of sound = 340 m/s.) 1824 Hz
8. A fireworks rocket explodes at a height of 150 m above the ground. An observer on the ground directly under the explosion experiences an average sound intensity of $7 \times 10^{-2} \text{ W/m}^2$. What is the sound level in dB heard by the observer? ($I_0 = 10^{-12} \text{ W/m}^2$) 108 dB
10. A clarinet behaves like a tube closed at one end. If its length is 50 cm, and the velocity of sound is 340 m/s, what is its fundamental frequency in Hz? 170 Hz

Ch 15

11. A charge of +2 C is at the origin. When charge Q is placed at 2.00 m along the positive x axis, the electric field at 2.00 m along the negative x axis becomes zero. What is the value of Q? -8 C

12. A charge $+Q$, is placed inside a balloon and the balloon is blown up. As the radius, r , of the balloon increases, the number of field lines going through the surface of the balloon *Stays the same.*

13. At what point is the electrical field associated with a uniformly-charged, hollow, metallic sphere greatest?
At the surface where r approaches zero.

14. Two point charges are placed along a horizontal axis with the following values and positions: $+5 \mu\text{C}$ at $x = 0 \text{ cm}$ and $-7 \mu\text{C}$ at $x = 20 \text{ cm}$. What is the magnitude of the electric field at the point midway between the two charges (at $x = 10 \text{ cm}$)?

15. Two point charges are separated by 8.0 cm and have charges of $+2.0 \mu\text{C}$ and $-2.0 \mu\text{C}$, respectively. What is the electric field at a point midway between the two charges?
 $2.25 \times 10^7 \text{ N/C}$

CH 19

16. When a magnetic field causes a charged particle to move in a circular path, the only quantity the magnetic force changes significantly while the particle goes around in a circle is the particle's *acceleration*

17. A 10.0-ohm , 25.0-mA galvanometer is to be converted into a voltmeter which reads 30.0 V at full-scale deflection. What resistance should be placed in series with the galvanometer coil?
 1190Ω

18. A current-carrying wire of length 0.500 m is positioned perpendicular to a uniform magnetic field. If the current is 5.00 A and it is determined that there is a resultant force of 2.25 N on the wire due to the interaction of the current and field, what is the magnetic field strength? 9T

19. A proton, mass 1.67×10^{-27} kg and charge $+1.60 \times 10^{-19}$ C, moves in a circular orbit perpendicular to a uniform magnetic field of 0.25 T. Find the time for the proton to make one complete circular orbit. $2.6 \times 10^{-7}\text{s}$

20. An electron is released such that its initial velocity is from left to right across this page. The electron's path, however, is deflected in a direction toward the bottom edge of the page due to the presence of a uniform magnetic field. What is the direction of this field? into page

21. Two parallel cables of a high-voltage transmission line carry equal and opposite currents of 1500 A. The distance between the cables is 3.00 m. What is the magnetic force acting on a 20.0-meter length of each cable? 3N

CH 22

22. One phenomenon that demonstrates the particle nature of light is Photoelectric effect

23. Light in air enters a diamond ($n = 2.42$) at an angle of incidence of 20.0° . What is the angle of refraction inside the diamond? 8.12°

24. A beam of light is incident upon a flat piece of glass ($n = 1.33$) at an angle of incidence of 30.0° . Part of the beam is transmitted and part is reflected. What is the angle between the reflected and transmitted rays? 128°

25. Dispersion occurs when
When one material slows down some wavelengths of light more than others.

26. If the velocity of light through an unknown liquid is measured at 2.90×10^8 m/s, what is the index of refraction of this liquid? ($c = 3.00 \times 10^8$ m/s) 1.03

27. If the critical angle for internal reflection inside a certain transparent material is found to be 45.0° , what is the index of refraction of the material? (Air is outside the material). 1.41

28. Describe what will happen to a light ray incident on an air-to-glass boundary at less than the critical angle? $\text{partial reflection-refraction}$

CH 23

30. Describe the image of a concave mirror when the object is at a distance greater than twice the focal point distance from the mirror? $\text{real, inverted, } M < 1$

31. If a man's face is 20.0 cm in front of a concave shaving mirror creating an upright image 1.50 times as large as the object, what is the mirror's focal length? 60cm

32. An object is placed at a distance of 20.0 cm from a thin lens along the axis. If a virtual image forms at a distance of 50.0 cm from the lens, on the same side as the object, what is the focal length of the lens? 33.3 cm
33. For a diverging lens with one flat surface, the radius of curvature for the curved surface is 20.0 cm. What must the index of refraction be so that the focal length is -10.0 cm? 3
34. Parallel rays of light that hit a concave mirror will come together... *the focal pt.*
35. A magnifying glass has a convex lens of focal length 10.0 cm. At what distance from a postage stamp should you hold this lens to get a magnification of +2? 5 cm
36. When the reflection of an object is seen in a concave mirror, the image will *either be real or virtual.*