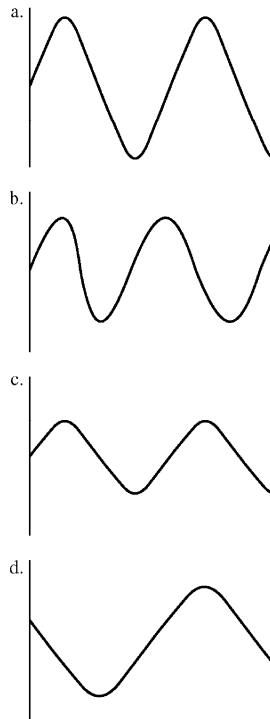
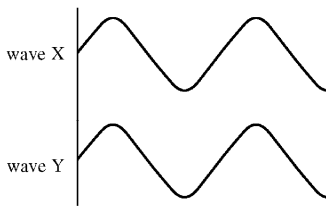


AP REVIEW 3**Multiple Choice**

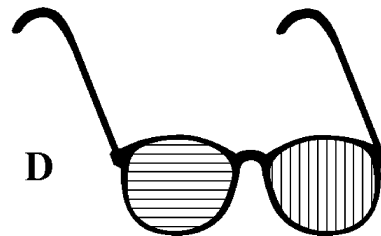
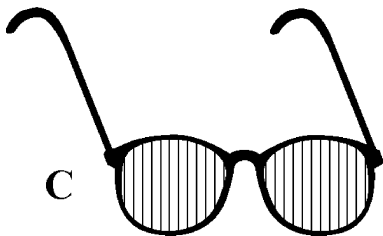
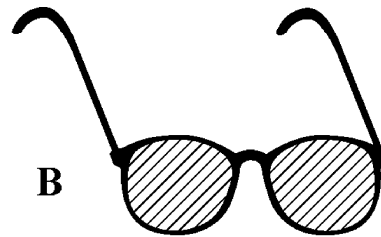
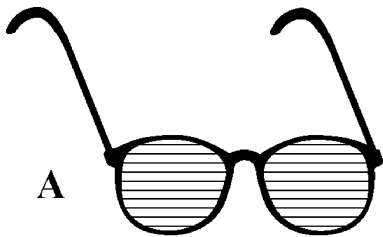
Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. For a mass hanging from a spring, the maximum displacement the spring is stretched or compressed from its equilibrium position is its
- a. amplitude.
 - b. period.
 - c. frequency.
 - d. acceleration.
- _____ 2. Which of the following is the number of cycles or vibrations per unit of time?
- a. amplitude
 - b. period
 - c. frequency
 - d. revolution
- _____ 3. By what factor should the length of a simple pendulum be changed if the period of vibration were to be tripled?
- a. 3
 - b. 6
 - c. 9
 - d. 27
- _____ 4. A mass on a spring vibrates in simple harmonic motion at an amplitude of 8.0 cm. If the mass of the object is 0.20 kg and the spring constant is 130 N/m, what is the frequency?
- a. 1.5 Hz
 - b. 8.7 Hz
 - c. 4.0 Hz
 - d. 1.6 Hz
- _____ 5. Which of the following is a single nonperiodic disturbance?
- a. pulse wave
 - b. periodic wave
 - c. sine wave
 - d. transverse wave
- _____ 6. A musical tone sounded on a piano has a frequency of 410 Hz and a wavelength of 0.80 m. What is the speed of the sound wave?
- a. 170 m/s
 - b. 240 m/s
 - c. 330 m/s
 - d. 590 m/s
- _____ 7. Bats can detect small objects, such as insects, that are approximately the size of one wavelength. If a bat emits a chirp at a frequency of 60.0 kHz and the speed of sound waves in air is 330 m/s, what is the size of the smallest insect that the bat can detect?
- a. 1.5 mm
 - b. 3.5 mm
 - c. 5.5 mm
 - d. 7.5 mm
- _____ 8. The superposition of mechanical waves can be observed in the movement of
- a. bumper cars.
 - b. waves in a ripple tank.
 - c. electromagnetic radiation.
 - d. an orchestra.



- ___ 9. In the diagram above, use the superposition principle to find the resultant wave of waves X and Y.
- | | |
|------|------|
| a. a | c. c |
| b. b | d. d |
- ___ 10. The trough of the sine curve used to represent a sound wave corresponds to
- condensation.
 - rarefaction.
 - the point where molecules vibrate at a right angle to the direction of wave travel.
 - a region of low elasticity.
- ___ 11. Which of the following are series of compressions in graphical representations of spherical and plane waves?
- | | |
|---------------|----------------|
| a. wavelength | c. rays |
| b. source | d. wave fronts |
- ___ 12. Which portion of the electromagnetic spectrum is used in a television?
- | | |
|-------------------|----------------|
| a. infrared waves | c. radio waves |
| b. microwaves | d. gamma waves |
- ___ 13. Which portion of the electromagnetic spectrum is used in a microscope?
- | | |
|-------------------|----------------------|
| a. infrared waves | c. visible light |
| b. gamma rays | d. ultraviolet light |
- ___ 14. Which portion of the electromagnetic spectrum is used to sterilize medical instruments?
- | | |
|-------------------|----------------------|
| a. infrared waves | c. X rays |
| b. microwaves | d. ultraviolet light |
- ___ 15. Snow reflects almost all of the light incident upon it. However, a single beam of light is not reflected in the form of parallel rays. This is an example of ___ reflection off of a ___ surface.
- | | |
|----------------------|----------------------|
| a. regular; rough | c. diffuse; specular |
| b. regular; specular | d. diffuse; rough |

- ___ 16. If a light ray strikes a flat mirror at an angle of 27° from the normal, the reflected ray will be
- 27° from the mirror's surface.
 - 27° from the normal.
 - 90° from the mirror's surface.
 - 63° from the normal.
- ___ 17. If a light ray strikes a flat mirror at an angle of 30° from the normal, the ray will be reflected at an angle of
- 30° from the mirror's surface.
 - 60° from the mirror's surface.
 - 60° from the normal.
 - 90° from the normal.
- ___ 18. When the reflection of an object is seen in a flat 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.
- ___ 19. If a virtual image is formed 10.0 cm along the principal axis from a convex mirror with a focal length of -15.0 cm, what is the object's distance from the mirror?
- 30.0 cm
 - 12 cm
 - 6.0 cm
 - 3.0 cm
- ___ 20. Which best describes the image of a concave mirror when the object's distance from the mirror is less than the focal-point distance?
- 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
- ___ 21. A parabolic mirror, instead of a spherical mirror, can be used to reduce the occurrence of which effect?
- spherical aberration
 - mirages
 - chromatic aberration
 - light scattering



- ___ 22. Which pair of glasses is best suited for automobile drivers? The transmission axes are shown by straight lines on the lenses. (Hint: The light reflects off the hood of the car.)
- A
 - B
 - C
 - D
- ___ 23. When a light ray passes from water ($n = 1.333$) into diamond ($n = 2.419$) at an angle of 45° , its path is
- bent toward the normal.
 - bent away from the normal.
 - parallel to the normal.
 - not bent.

- _____ 34. If the stable nuclei are plotted with neutron number versus proton number, the curve formed by the stable nuclei does not follow the line $N = Z$. This is predicted by examining how the binding energy is influenced by
- the volume of the nucleus.
 - the size of the nuclear surface.
 - the Coulomb repulsive force.
 - the proton-neutron mass difference.
- _____ 35. What is the binding energy per nucleon of the tritium nucleus, ${}^3_1\text{H}$? ($c^2 = 931.50 \text{ MeV/u}$; atomic masses: ${}^3_1\text{H} = 3.016\,049 \text{ u}$; ${}^1_1\text{H} = 1.007\,825 \text{ u}$; $m_n = 1.008\,665 \text{ u}$)
- 2.243 MeV/nucleon
 - 2.454 MeV/nucleon
 - 2.827 MeV/nucleon
 - 2.196 MeV/nucleon
- _____ 36. The components of natural radiation, in order from least to most penetrating, are
- alpha, beta, and gamma.
 - gamma, beta, and alpha.
 - beta, gamma, and alpha.
 - alpha, gamma, and beta.
- _____ 37. Radium-226 decays to radon-222 by emitting
- beta particles.
 - alpha particles.
 - gamma particles.
 - positrons.
- _____ 38. How is a fission reactor different from a fusion reactor?
- The fuel is cheaper.
 - The fuel must be processed.
 - There is less radioactive waste.
 - The transportation of fuel is safer.
- _____ 39. Which of the following is an example of a baryon?
- meson
 - electron
 - lepton
 - proton and neutron
- _____ 40. Hadrons are composed of
- leptons.
 - electrons.
 - mesons, baryons, and antibaryons.
 - neutrinos.

AP REVIEW 3
Answer Section

MULTIPLE CHOICE

1. A
2. C
3. C
4. C
5. A
6. C
7. C
8. B
9. A
10. B
11. D
12. C
13. C
14. D
15. D
16. B
17. B
18. B
19. A
20. A
21. A
22. C
23. A
24. D
25. A
26. C
27. C
28. C
29. B
30. C
31. C
32. D
33. C
34. C
35. C
36. A
37. B
38. B
39. A

40. C