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.	c.	frequency.
	b. period.	d.	acceleration.
 2.	Which of the following is the number of cycles	s or v	vibrations per unit of time?
	a. amplitude	c.	frequency
	b. period	d.	revolution
 3.	By what factor should the length of a simple petripled?	endu	lum be changed if the period of vibration were to be
	a. 3	c.	9
	b. 6	d.	27
 4.	A mass on a spring vibrates in simple harmonia	c mo	tion 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, wh	nat is	the frequency?
	a. 1.5 Hz	c.	4.0 Hz
	b. 8.7 Hz	d.	1.6 Hz
 5.	Which of the following is a single nonperiodic	dist	urbance?
	a. pulse wave	c.	sine wave
	b. periodic wave	d.	transverse wave
 6.	A musical tone sounded on a piano has a frequ	ency	of 410 Hz and a wavelength of 0.80 m. What is the speed
	of the sound wave?		
	a. 170 m/s	c.	330 m/s
	b. 240 m/s	d.	590 m/s
 7.	Bats can detect small objects, such as insects, t	hat a	are approximately the size of one wavelength. If a bat
	emits a chirp at a frequency of 60.0 kHz and th	e spo	eed 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	c.	5.5 mm
	b. 3.5 mm	d.	7.5 mm
 8.	The superposition of mechanical waves can be	obse	erved in the movement of
	a. bumper cars.	c.	electromagnetic radiation.
	b. waves in a ripple tank.	d.	an orchestra.

	wave X a.
	d.
9	In the diagram above, use the superposition principle to find the resultant wave of waves \mathbf{X} and \mathbf{Y}
).	a. a c. c
10	b. b d. d
 10.	a. condensation.
	b. rarefaction.
	c. the point where molecules vibrate at a right angle to the direction of wave travel.
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?
	b. microwaves d. gamma waves
 13.	Which portion of the electromagnetic spectrum is used in a microscope?
	a. infrared waves c. visible light
14	b. gamma rays d. unraviolet light Which portion of the electromagnetic spectrum is used to sterilize medical instruments?
 17.	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 the reflection off of a surface
	a. regular; rough c. diffuse; specular
	b. regular; specular d. diffuse; rough

Name:

b.

- _____ 16. If a light ray strikes a flat mirror at an angle of 27° from the normal, the reflected ray will be
 - a. 27° from the mirror's surface.
 - 27° from the normal. d. 6
 - 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
 - a. 30° from the mirror's surface. c. 60° from the normal.
 - b. 60° from the mirror's surface. d. 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 a. the wavelength of light used for viewing.
 - b. the distance from the object to the mirror.
 - c. the distance of both the observer and the object to the mirror.
 - d. 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?
 - a. 30.0 cm c. 6.0 cm b. 12 cm d. 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?
 - a. virtual, upright, and magnification greater than one
 - b. real, inverted, and magnification less than one
 - c. virtual, upright, and magnification less than one
 - d. 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?
 - a. spherical aberration

c. chromatic aberration

b. mirages

d. 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. A b. B

- c. C d. 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
 - a. bent toward the normal.

- c. parallel to the normal.
- b. bent away from the normal.
- d. not bent.

- c. 90° from the mirror's surface.
 - d. 63° from the normal.

 24.	An object is placed 40.0 cm from a converging lens along the axis of the lens. If a virtual image forms at a				
	distance of 50.0 cm from the lens on the same 22.0 cm	side	as the object, what is the focal length of the lens?		
	a. 22.0 cm	с. а	90.0 cm		
25		u.			
 25.	An object that is 18 cm from a converging lens forms a real image 22.5 cm from the lens. What is the magnification of the image?				
	a. –1.25	c.	-0.80		
	b. 1.25	d.	0.80		
 26.	At the first dark band in a single-slit diffraction by	n pat	tern, the path lengths of selected pairs of wavelets differ		
	a. one wavelength.	c.	one-half wavelength.		
	b. more than one wavelength.	d.	less than half of one wavelength.		
 27.	How much energy does a photon of red light th	nat h	as a wavelength of 640 nm contain?		
	$(h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s}; 1 \text{ eV} = 1.6 \times 10^{-19} \text{ J})$		-		
	a. 3.2 eV	c.	1.9 eV		
	b. 2.5 eV	d.	1.3 eV		
28.	A monochromatic light beam with a quantum ϵ	energ	y value of 3.0 eV is incident upon a photocell. The work		
	function of the target metal is 1.60 eV. What is	s the	maximum kinetic energy of ejected electrons?		
	a. 4.6 eV	c.	1.4 eV		
	b. 4.8 eV	d.	2.4 eV		
29.	Blue light with a wavelength of 460 nm is inci-	dent	on a piece of potassium. The work function of potassium		
 _, ,	is 2.2 eV. What is the maximum kinetic energy	v of t	he elected photoelectrons? ($h = 6.63 \times 10^{-34}$ J•s: c		
	$= 3.00 \times 10^8$ m/s· 1 eV = 1.60 × 10 ⁻¹⁹ J)				
	a. 1.0 eV	c.	0.25 eV		
	b. 0.50 eV	d.	4.9 eV		
30	A sodium surface is illuminated with light that	has	a frequency of 1.00×10^{15} Hz. The threshold frequency of		
 50.	sodium is 5.51×10^{14} Hz. The maximum kineti	ic en	ergy of the photoelectrons is 1.86 eV. What is the work		
	function of sodium?		• • • • •		
	a. 1.90 eV	с.	2.28 eV		
	b. 2.08 eV	d.	3.23 eV		
 31.	The dark lines in the absorption spectrum of an	n ele	ment can be accounted for by the		
	a. absorption of photons that occurs when ele	ectro	ons jump from a higher-energy state to a		
	lower-energy state.				
	b. emission of photons that occurs when electrons jump from a higher-energy state to a				
	lower-energy state.				
	bigher energy state	ectre	ons jump from a lower-energy state to a		
	d emission of photons that occurs when elec	otron	s jump from a lower energy state to a		
	higher energy state	Juon	s jump from a lower-energy state to a		
22	Ingher-energy state.	.1			
 32.	What is the de Broglie wavelength for a proton $5.0 \times 10^{-5} \text{ m/s}? (h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s})$	i tha	t has a mass of 1.67×10^{-27} kg and is moving at a speed of		
	a. $1.1 \times 10^{12} \text{ m}$	c.	$1.8 \times 10^{12} \text{ m}$		
	b. 4.2×10^{-13} m	d.	$7.9 \times 10^{-13} \text{ m}$		
33.	According to Heisenberg, as soon as the exact	loca	tion of an electron is known, its		
 	a. exact momentum is known.	. C.	momentum becomes uncertain.		
	b. energy becomes stabilized.	d.	direction becomes stabilized.		

Name: _____

 34.	If the stable nuclei are plotted with neutron numl nuclei does not follow the line $N = Z$. This is pre	ber edic	versus proton number, the curve formed by the stable sted by examining how the binding energy is influenced by
	a. the volume of the nucleus.	с.	the Coulomb repulsive force.
	b. the size of the nuclear surface.	1.	the proton-neutron mass difference.
 35.	What is the binding energy per nucleon of the tri	itiu	m nucleus, ${}_{1}^{3}$ H? (c^{2} = 931.50 MeV/u; atomic masses:
	${}_{1}^{3}$ H = 3.016 049 u; ${}_{1}^{1}$ H = 1.007 825 u; m_{n} = 1.008	66	5 u)
	a. 2.243 MeV/nucleon	с.	2.827 MeV/nucleon
	b. 2.454 MeV/nucleon	l.	2.196 MeV/nucleon
 36.	The components of natural radiation, in order from	om	least to most penetrating, are
	a. alpha, beta, and gamma.	с.	beta, gamma, and alpha.
	b. gamma, beta, and alpha.	1.	alpha, gamma, and beta.
 37.	Radium-226 decays to radon-222 by emitting		
	a. beta particles.	с.	gamma particles.
	b. alpha particles.	1.	positrons.
 38.	How is a fission reactor different from a fusion r	eac	ctor?
	a. The fuel is cheaper.	с.	There is less radioactive waste.
	b. The fuel must be processed.	1.	The transportation of fuel is safer.
 39.	Which of the following is an example of a baryo	n?	
	a. meson c	с.	lepton
	b. electron d	1.	proton and neutron
 40.	Hadrons are composed of		
	a. leptons.	с.	mesons, baryons, and antibaryons.
	b. electrons.	1.	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. B38. B
- 50. D
- 39. A

40. C