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Class:

Date:

Physics spring practice final

Multiple Choice

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

Impulse and momentum

- 1. A 0.2 kg baseball if pitched with a velocity of 40 m/s and is then batted to the pitcher with a velocity of 60 m/s. What is the magnitude of change in the ball's momentum?
 - 4 kg•m/s 2 kg•m/s a. C.
 - b. 8 kg•m/s 20 kg•m/s d.
- 2. A force is applied to stop a moving shopping cart. Increasing the time interval over which the force is applied
 - requires a greater force. requires a smaller force. c. a. b
 - has no effect on the force needed. d. requires the same force.
- 3. The change in an object's momentum is equal to
 - the product of the mass of the object and the time interval. a.
 - b. the product of the force applied to the object and the time interval.
 - the time interval divided by the net external force. C.
 - d. the net external force divided by the time interval.
 - 4. What velocity must a 1340 kg car have in order to have the same momentum as a 2680 kg truck traveling at a velocity of 15 m/s to the west?
 - 6.0×10^1 m/s to the west а
 - c. 3.0×10^1 m/s to the west 3.0×10^1 m/s to the east
 - b. 6.0×10^1 m/s to the east d.
 - 5. Which of the following has the greatest momentum?
 - truck with a mass of 2250 kg moving at a velocity of 25 m/s a.
 - b. car with a mass of 1210 kg moving at a velocity of 51 m/s
 - truck with a mass of 6120 kg moving at a velocity of 10 m/s c.
 - d. car with a mass of 1540 kg moving at a velocity of 38 m/s

Waves

- 6. What do waves carry from one place to another?
 - energy a. atoms c.
 - surfers b. particles d.
- 7. Which of the following is the time it takes to complete a cycle of motion?
 - frequency a. amplitude C. b.
 - period revolution d.
 - 8. Which of the following is the number of cycles or vibrations per unit of time?
 - a. amplitude c. frequency
 - b. period revolution d.
 - 9. Which statement about sound waves is correct?
 - They generally travel faster through solids than through gases. a.
 - They generally travel faster through gases than through solids. b.
 - c. They generally travel faster through gases than liquids.
 - d. They generally travel faster than light.

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10.	Which of the following will effect the speed of	sou	nd?
	a. frequency	c.	wavelength
	b. medium (substance it is traveling through)	d.	the speed at which the source is moving
 11.	An amusement park ride has a frequency of 0.0	5 H	z. What is the ride's period?
	a. 5 s	c.	20 s
	b. 10 s	d.	40 s
 12.	What type of waves are sound waves?		
	a. longitudinal	c.	transverse
	b. decompression	d.	compression
 13.	What type of waves are ocean waves		
	a. longitudinal	c.	transverse
	b. decompression	d.	compression
 14.	Which is not a part of the electromagnetic spect	trum	n?
	a. infrared waves	c.	sound waves
	b. microwaves	d.	gamma waves
 15.	Which of the following is the interference that i	resu	Its when individual displacements on opposite sides of the
	equilibrium position are added together to form	the	resultant wave?
	a. constructive	C.	complete constructive
	b. destructive	d.	complete destructive
 16.	A periodic wave has a wavelength of 0.50 m an	d a	speed of 20 m/s. What is the wave frequency?
	a. 0.02 Hz	c.	40 Hz
	b. 20 Hz	d.	10 Hz
 17.	A musical tone sounded on a piano has a freque of the sound wave?	ency	of 410 Hz and a wavelength of 0.80 m. What is the speed
	a. 170 m/s	c.	330 m/s
	b. 240 m/s	d.	590 m/s
 18.	A radio wave has a speed of 3.00×10^8 m/s and	l a fi	requency of 107 MHz. What is the wavelength? MHz =
	10 ⁶ Hz		
	a. 3.21 m	c.	0.100 m
	b. 45.0 m	d.	2.79 m
 19.	If you hear the pitch of a siren become lower, y	ou k	know that
	a. neither you nor the siren is moving.		
	b. you are moving toward the siren or the sire	n 1s	moving toward you.
	c. you are moving away from the siren or the	sire	en is moving toward you.
• •	d. the source has just passed you or it is accel	erat	ing away from you.
 20.	Sound waves		
	a. are a part of the electromagnetic spectrum.		
	b. do not require a medium for transmission.		
	c. are longitudinal waves.		

d. are transverse waves.



- _ 21. In the waveform of the longitudinal wave shown above, the compressed regions correspond to
 - a. the wavelength.

- c. troughs.
- b. crests. d.
- 22. What type of wave is shown in the above spring?
 - a. longitudinal
 - b. decompression

- I. the mass.
- c. transversed. compression



23. In the diagram above, use the superposition principle to find the resultant wave of waves Q and R.

с

d

a. a b. b c. d.



- 24. Which of the following types of interference will occur in the figure above?
 - a. partial constructive c. complete constructive
 - b. partial destructive d. complete destructive
- 25. 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	c.	5.5 mm
b.	3.5 mm	d.	7.5 mm

Electicity and Magnetism

- 26. Consider two long, straight, parallel wires, each carrying a current *I*. If the currents move in the same direction,
 - a. the two wires will attract each other.
 - b. the two wires will repel each other.
 - c. the two wires will exert a torque on each other.
 - d. neither wire will exert a force on the other.



A stationary positive charge, Q, is located in a magnetic field, B, which is directed toward the right, as shown in the figure above. The direction of the magnetic force on Q is

- a. toward the right. c. down.
- b. up. d. There is no magnetic force.
- 28. A 2.0 m wire segment carrying a current of 0.60 A oriented parallel to a uniform magnetic field of 0.50 T experiences a force of what magnitude?
 a 0.60 N
 c 0.15 N

a.	0.60 N	с.	0.151
b.	0.30 N	d.	0.0 N

29. If a proton is released at the equator and falls toward Earth under the influence of gravity, the magnetic force on the proton will be toward the

a.	north.	C.	east.
b.	south.	d.	west

 30.	An electron moves north at a velocity of 4.5×10^4 m/s and has a force of 7.2×10^{-18} N exerted on it. If the			
	magnetic field points upward, what is the mag	nitud	le of the magnetic field?	
	a. 2.0 mT	c.	3.6 mT	
	b. 1.0 mT	d.	4.8 mT	
 31.	An electron that moves with a speed of 3.0×1	0^4 m	1/s perpendicular to a uniform magnetic field of 0.40 T	
	experiences a force of what magnitude? $(e - 1)$.00 ×	(10^{-5}C)	
	a. 4.8×10^{-1} N	С.	$2.2 \times 10^{21} \text{ N}$	
	b. $1.9 \times 10^{15} \text{ N}$	a.	0	
 32.	A current in a long, straight wire produces a m	agne	tic field. These magnetic field lines	
	a. go out from the wire to infinity.	c.	form circles that pass through the wire.	
	b. come in from infinity to the wire.	d.	form circles that go around the wire.	
 33.	In a magnetized substance, the domains			
	a. are randomly oriented.	c.	line up mainly in one direction.	
	b. cancel each other.	d.	can never be reoriented.	
 34.	A microscopic magnetic region composed of a	grou	up of atoms whose magnetic fields are aligned in a	
	common direction is called a(n) In most	mate	erials, when these groups are randomly distributed, the	
	substance will show magnetism.			
	a. domain; no	c.	cell; unusual	
	b. pole; some	d.	ion; strong	
35.	Where is the magnitude of the magnetic field a	aroun	d a permanent magnet greatest?	
	a. close to the poles			
	b. far from the poles			
	c. The magnitude is equal at all points on the	e fiel	d.	
	d. The magnitude depends on the material of	f the	magnet.	
36.	Three resistors connected in parallel carry curr	ents	labeled I_1 , I_2 , and I_3 . Which of the following expresses the	
	total current I_t in the combined system?			
	a. $I_t = I_1 + I_2 + I_3$	c.	$I_t = I_1 = I_2 = I_3$	
	b. $I_t = (1I_1 + 1/I_2 + 1/I_3)$	d.	$I_t = (1I_1 + 1/I_2 + 1/I_3)^{-1}$	
37.	Three resistors with values of 4.0 Ω . 6.0 Ω . and	d 10	0Ω are connected in parallel. What is their equivalent	
 	resistance?		r i i i i i i i i i i i i i i i i i i i	
	a. 20.0 Ω	c.	6.0 Ω	
	b. 7.3 Ω	d.	1.9 Ω	
38	Three resistors connected in series carry current	nts la	beled I_1 I_2 and I_2 respectively. Which of the following	
 50.	expresses the total current L in the system ma	nde u	n of the three resistors in series?	
	$a \qquad L = I_1 + I_2 + I_3$		$L = I_1 = I_2 = I_2$	
	b. $I_1 = (1I_1 + 1/I_2 + 1/I_3)$	d.	$I_t = (1I_t + 1/I_2 + 1/I_2)^{-1}$	
20	Three registers with values of $40.0.600$ or		Γ_{I} ($\Pi_{I} + \Pi_{I}$) Γ_{I} (Π_{I}) Γ_{I}	
 39.	equivalent resistance?	a 8.0	3 22, respectively, are connected in series. what is their	
	a. 18	c.	6.0	
	b. 8.0	d.	1.8	
40	If the batteries in a portable CD player provide	e a ter	rminal voltage of 12 V what is the notential difference	
 10.	across the entire player?	. u 10	initial totage of 12 t, that is the potential difference	
	a. 3.0 V	c.	6.0 V	
	b. 4.0 V	d.	12 V	
	····			

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 41.	. Which of the following transfers charge most easily?	
	a. nonconductors c.	semiconductors
	b. conductors d.	insulators
 42.	. Which of the following is NOT true for BOTH gravi	tational and electric forces?
	a. The inverse square distance law applies.	
	 c. Potential energy is a function of distance of sen; 	aration
	d. Forces are either attractive or repulsive.	
43	Two point charges initially 2 cm apart are moved to	a distance of 10 cm apart By what factor do the
 	resulting electric and gravitational forces between th	em change?
	a. 5 c.	<u>1</u>
	b 25 d	1
	0. 25 d.	25
 44.	. If two point charges are separated by 1.5 cm and hav	re charge values of 2.0 μ C and -4.0 μ C, respectively,
	what is the value of the mutual force between them?	$(k_c = 8.99 \times 10^9 \mathrm{N} \cdot \mathrm{m}^2/\mathrm{C}^2)$
	a. 320 N c.	8.0×10^{-12}
	b. 3.6×10^{-8} N d.	3.1 × 10 ⁻³ N
 45.	. Consider a thundercloud that has an electric charge of	of 40.0 C near the top of the cloud and -40.0 C near the
	bottom of the cloud. These charges are separated by between these two sets of charges? $(k = 8.00 \times 10^{9})$	about 2.0 km. what is the magnitude of the electric force N_{em^2/C^2}
	between these two sets of charges? $(\kappa_c - 8.99 \times 10^{4})$	$3.6 \times 106 \mathrm{N}$
	a. 3.6×10^{10} N d	$3.6 \times 10^{7} \text{ N}$
46	A repelling force occurs between two charged object	ts when
 т 0.	a charges are of unlike signs c	charges are of equal magnitude
	b. charges are of like signs. d.	charges are of unequal magnitude.
47.	If the measured resistance of a lamp is 45 Ω when it	operates at a power of 80.0 W, what is the current in the
	lamp?	
	a. 1.8 A c.	0.75A
	b. 1.3 A d.	0.56A
 48.	. If a lamp has a resistance of 136 Ω when it operates	at a power of 1.00×10^2 W, what is the potential
	difference across the lamp?	
	a. 117 V c.	125 V
	b. 136 V d.	220 V
 49.	. If a 325 W heater has a current of 6.0 A , what is the	resistance of the heating element?
	a. 88Ω c.	9.0 \(\Omega)
50		
 50.	. If a $/5$ W lightbulb operates at a voltage of 120 V, w	that is the current in the bulb?
	a. 0.62 A c.	$1.95 \times 10^{2} \text{ A}$
	b. 1.6 A d.	9.0×10^3 A
 51.	Which of the following wires would have the greate	st resistance?
	a. an aluminum wire 10 cm in length and 3 cm in c	diameter
	u. an aluminum wire 5 cm in length and 5 cm in di	liameter
	d. an aluminum wire 5 cm in length and 5 cm in di	ameter
	an araminani whe 5 cm in length and 5 cm in di	

- 52. The amount of charge that moves through the filament of a lightbulb in 2.00 s is 2.67 C. What is the current in the lightbulb? a. 5.34 A c. 0.835 A
 - a. 5.34 A b. 1.33 A
 - 1.33 A d. 0.417 A
- 53. A wire carries a steady current of 0.1 A over a period of 20 s. What total charge moves through the wire in this time interval?
 - a. 200 C
 c. 2 C

 b. 20 C
 d. 0.005 C



54. What is the equivalent resistance for the resistors in the figure above?

a. 2.3Ω c. b. 5.2Ω d.

- $12 \text{ V} = 4.0 \Omega \underbrace{}_{4.0 \Omega} \underbrace{6.0 \Omega}_{4.0 \Omega} \underbrace{}_{6.0 \Omega} \underbrace{}_{10.0 \Omega}$
- 55. Three resistors connected in parallel have individual values of 4.0 Ω , 6.0 Ω , and 10.0 Ω , as shown above. If this combination is connected in series with a 12.0 V battery and a 2.0 Ω resistor, what is the current in the 10.0 Ω resistor?

13 Ω

 22Ω

a.0.59 Ac.11Ab.1.0 Ad.16A

_ 56. If a force of 50 N stretches a spring 0.10 m, what is the spring constant?

 a. 5 N/m
 c. 10 N/m

 b. 500 N/m
 d. 1000 N/m



- 57. Which compass needle orientation in the figure above might correctly describe the magnet's field at that point?a. ac. c
 - a. a c. c b. b d. d

Universal Gravity

58. The gravitational force between two masses is 36 N. What is the gravitational force if the distance between them is tripled? ($G = 6.673 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$)

	1	U ,	
a.	4.0 N	с.	18 N
b	90N	d	27 N

59. Two small masses that are 10.0 cm apart attract each other with a force of 10.0 N. When they are 5.0 cm apart, these masses will attract each other with what force?

$(G = 6.673 \times$	10^{-11}	$N \bullet m^2/kg^2$)	

a.	5.0 N	c.	20.0 N
b.	2.5 N	d.	40.0 N

Physics spring practice final Answer Section

MULTIPLE CHOICE

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

40.	ANS:	D	PTS:	1
41.	ANS:	В	PTS:	1
42.	ANS:	D	PTS:	1
43.	ANS:	D	PTS:	1
44.	ANS:	А	PTS:	1
45.	ANS:	С	PTS:	1
46.	ANS:	В	PTS:	1
47.	ANS:	В	PTS:	1
48.	ANS:	А	PTS:	1
49.	ANS:	С	PTS:	1
50.	ANS:	А	PTS:	1
51.	ANS:	А	PTS:	1
52.	ANS:	В	PTS:	1
53.	ANS:	С	PTS:	1
54.	ANS:	В	PTS:	1
55.	ANS:	А	PTS:	1
56.	ANS:	В	PTS:	1
57.	ANS:	А	PTS:	1
58.	ANS:	А	PTS:	1
59.	ANS:	D	PTS:	1