

Physics spring practice final**Multiple Choice**

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

Impulse and momentum $ft = m\Delta v$

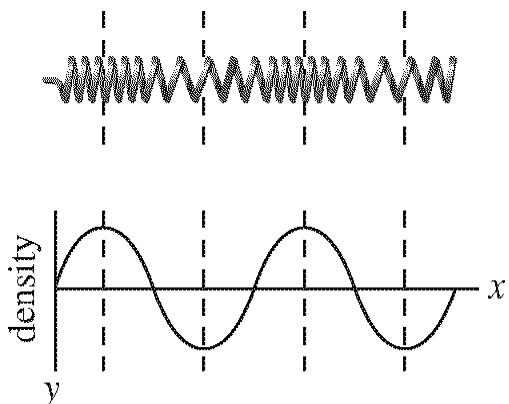
- 1 A 0.20 kg baseball is pitched with a velocity of 20 m/s and is then batted to the pitcher with a velocity of 20 m/s. What is the magnitude of change in the ball's momentum?
- A 4 kg•m/s
 - B 8 kg•m/s
 - C 2 kg•m/s
 - D 20 kg•m/s
- 2 A force is applied to stop a moving shopping cart. Decreasing the time interval over which the force is applied
- A requires a greater force.
 - B has no effect on the force needed.
 - C requires a smaller force.
 - D requires the same force.
- 3 The change in an object's momentum is equal to
- A the product of the mass of the object and the time interval.
 - B the product of the net force applied to the object and the time interval.
 - C the time interval divided by the net external force.
 - D the net external force divided by the time interval.
- 4 What velocity must a 2000. kg truck have in order to have the same momentum as a 1000. kg car traveling at a velocity of 20. m/s to the west?
- A 10 m/s to the west
 - B 20 m/s to the east
 - C 40 m/s to the west
 - D 5.0 m/s to the west
- 5 Which of the following has the greatest momentum?
- A truck with a mass of 2000 kg moving at a velocity of 25 m/s
 - B car with a mass of 1000 kg moving at a velocity of 51 m/s
 - C truck with a mass of 3000 kg moving at a velocity of 10 m/s
 - D car with a mass of 1500 kg moving at a velocity of 40 m/s
- 6 Which of the following is the proper rearranged formula for impulse momentum equation solved for time?
- A $t = fm\Delta v$
 - B $t = \frac{m\Delta v}{f}$
 - C $f = \frac{m\Delta v}{t}$
 - D $t = \frac{f}{m\Delta v}$
- 7 If an object has a change of momentum of 100 kgm/s, what is the impulse applied to that object?
- A 100 Ns
 - B 200 Ns
 - C 50 Ns
 - D not enough information provided

- 8 The law of conservation of momentum states that
- A the total initial momentum of all objects interacting with one another usually equals the total final momentum.
 - B the total initial momentum of all objects interacting with one another does not equal the total final momentum.
 - C the total momentum of all objects interacting with one another is zero.
 - D the total momentum of all objects interacting with one another remains constant regardless of the nature of the forces between the objects.
- 9 Two skaters stand facing each other. One skater's mass is 60 kg, and the other's mass is 72 kg. If the skaters push away from each other without spinning,
- A the 60 kg skater travels at a lower momentum.
 - B their momenta are equal but opposite.
 - C their total momentum doubles.
 - D their total momentum decreases.
- 10 A swimmer with a mass of 100 kg dives off a raft with a mass of 500 kg. If the swimmer's speed is 5 m/s immediately after leaving the raft, what is the speed of the raft?
- A 25 m/s
 - B 3.0 m/s
 - C 1.0 m/s
 - D 5.0 m/s
- Waves $v = f\lambda$
- 11 _____ carry energy from one place to another.
- A Elfs
 - B Waves
 - C People
 - D Pulses
- 12 Which of the following is the time it takes to complete a cycle of motion?
- A amplitude
 - B period
 - C frequency
 - D revolution
- 13 Which of the following is the number of cycles or vibrations per unit of time?
- A amplitude
 - B period
 - C frequency
 - D revolution
- 14 Which of the following is the proper unit for frequency?
- A second
 - B hertz
 - C minute
 - D meter
- 15 Which statement about sound waves is correct?
- A They generally travel faster through solids than through gases.
 - B They generally travel faster through gases than through solids.
 - C They generally travel faster through gases than liquids.
 - D They generally travel faster than light.
- 16 Which of the following will effect the speed of sound?
- A frequency
 - B medium (substance it is traveling through)
 - C wavelength
 - D the speed at which the source is moving
- 17 An amusement park ride has a frequency of 0.025 Hz. What is the ride's period?
- A 5 s
 - B 10 s
 - C 20 s
 - D 40 s
- 18 An amusement park ride takes 50 seconds to make one revolution. What is the ride's frequency?
- A 0.02 Hz
 - B 50. Hz
 - C 0.10 Hz
 - D 0.20 Hz

- [19] What type of waves are sound waves?
A longitudinal
B decompression
C transverse
D compression
- [20] What type of waves are vibrate perpendicular to the direction of motion?
A longitudinal
B decompression
C transverse
D compression
- [21] What type of waves are vibrate in the direction of motion?
A longitudinal
B decompression
C transverse
D compression
- [22] Which is not a part of the electromagnetic spectrum?
A infrared waves
B microwaves
C sound waves
D gamma waves
- [23] Which of the following is the interference that results when individual displacements on the **same side** of the equilibrium position are added together to form the resultant wave?
A constructive
B destructive
C complete constructive
D complete destructive
- [24] A periodic wave has a wavelength of 2 m and a speed of 10 m/s. What is the wave frequency?
A 0.5 Hz
B 5. Hz
C 20 Hz
D 12 Hz
- [25] A musical tone sounded on a piano has a frequency of 200 Hz and a wavelength of 1.7 m. What is the speed of the sound wave?
A 117 m/s
B 340 m/s
C 230 m/s
D 0.0085 m/s
- [26] A radio wave has a speed of 3.00×10^8 m/s and a frequency of 100. MHz. What is the wavelength?
MHz = 10^6 Hz
A 3.00 m
B 400 m
C 300 m
D 0.30 m
- [27] If you hear the pitch of a siren become higher, you know that
A neither you nor the siren is moving.
B you are moving toward the siren or the siren is moving toward you.
C you are moving away from the siren or the siren is moving toward you.
D the source has just passed you or it is accelerating away from you.
- [28] 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.

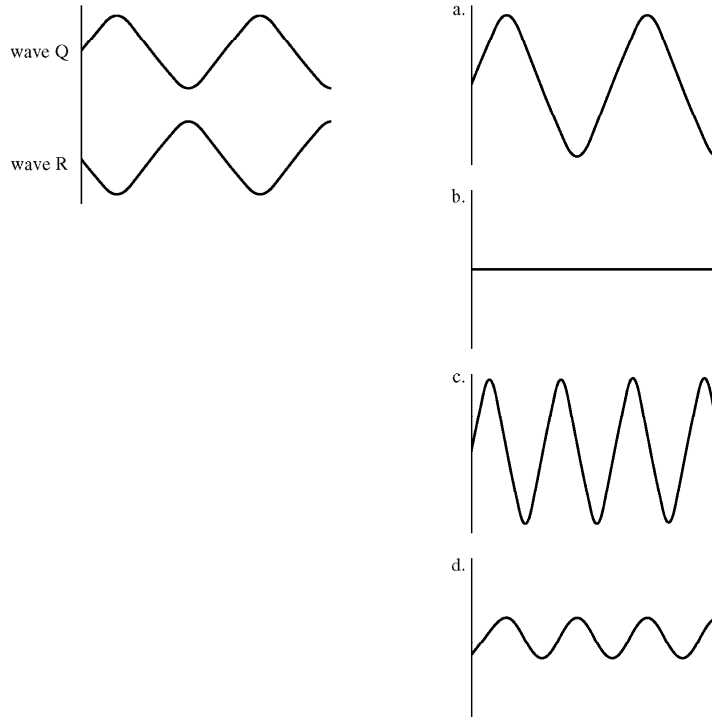
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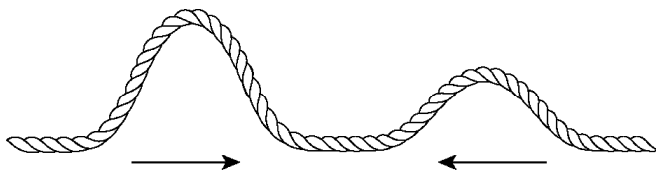
- 29 In the waveform of the longitudinal wave shown above, the **decompressed** regions correspond to
- A the wavelength.
 - B crests.
 - C troughs.
 - D the mass.

- 30 What type of wave is shown in the above spring?
- A longitudinal
 - B decompression
 - C transverse
 - D compression
- 31 If a force of 10. N stretches a spring 0.2 m, what is the spring constant? $f = -xk$
- A 5 N/m
 - B 0.020 N/m
 - C 50 N/m
 - D 2.0 N/m



- 32 In the diagram above, use the superposition principle to find the resultant wave of waves Q and R.
- A a
B b
C c
D d

- 33 Dolphins can detect small objects, such as fish, that are approximately the size of one wavelength. If a dolphin emits a chirp at a frequency of 100. kHz and the speed of sound waves in air is 1500 m/s, what is the size of the smallest fish that the dolphin can detect?
- A 15.0 mm
B 10.0 mm
C 6.67 mm
D 0.067 mm



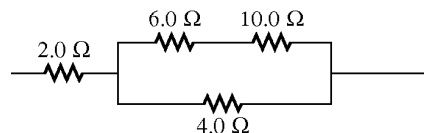
- 34 Which of the following types of interference will occur in the figure above?
- A partial constructive
B partial destructive
C complete constructive
D complete destructive

Electricity

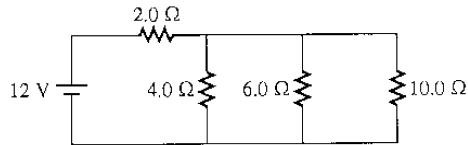
- 35 Three resistors connected in parallel carry currents labeled I_1 , I_2 , and I_3 . Which of the following expresses the total current I_t in the combined system?
- A $I_t = I_1 + I_2 + I_3$
B $I_t = (1/I_1 + 1/I_2 + 1/I_3)$
C $I_t = I_1 = I_2 = I_3$
D $I_t = (1/I_1 + 1/I_2 + 1/I_3)^{-1}$
- 36 Three resistors with values of $1.0\ \Omega$, $3.0\ \Omega$, and $6.0\ \Omega$ are connected in parallel. What is their equivalent resistance?
- A $10.0\ \Omega$
B $0.67\ \Omega$
C $1.0\ \Omega$
D $1.5\ \Omega$
- 37 Three resistors with values of $1.0\ \Omega$, $3.0\ \Omega$, and $6.0\ \Omega$ are connected in series. What is their equivalent resistance?
- A $10.0\ \Omega$
B $0.67\ \Omega$
C $1.0\ \Omega$
D $1.5\ \Omega$
- 38 Three resistors with values of $2.0\ \Omega$, $4.0\ \Omega$, and $8.0\ \Omega$ are connected in parallel. What is their equivalent resistance?
- A $14.0\ \Omega$
B $0.88\ \Omega$
C $1.1\ \Omega$
D $1.5\ \Omega$
- 39 Three resistors with values of $2.0\ \Omega$, $4.0\ \Omega$, and $8.0\ \Omega$ are connected in series. What is their equivalent resistance?
- A $14.0\ \Omega$
B $0.88\ \Omega$
C $1.1\ \Omega$
D $1.5\ \Omega$
- 40 Three resistors connected in series carry currents labeled I_1 , I_2 , and I_3 , respectively. Which of the following expresses the total current, I_t , in the system made up of the three resistors in series?
- A $I_t = I_1 + I_2 + I_3$
B $I_t = (1/I_1 + 1/I_2 + 1/I_3)$
C $I_t = I_1 = I_2 = I_3$
D $I_t = (1/I_1 + 1/I_2 + 1/I_3)^{-1}$
- 41 Which of the following resists transfers charge?
- A nonconductors
B conductors
C semiconductors
D insulators
- 42 Which of the following transfers charge most easily?
- A nonconductors
B conductors
C semiconductors
D insulators
- 43 Which of the following is NOT true for BOTH gravitational and electric forces?
- A The inverse square distance law applies.
B Forces are conservative.
C Potential energy is a function of distance of separation.
D Forces are either attractive or repulsive.
- 44 Two point charges, initially 5 cm apart, are moved to a distance of 10 cm apart. By what factor do the resulting electric and gravitational forces between them change?
- A 5
B 25
C $\frac{1}{4}$
D $\frac{1}{2}$

- 45 If two point charges are separated by 0.10 m and have charge values of $2.0 \mu\text{C}$ and $-4.0 \mu\text{C}$, respectively, what is the value of the mutual force between them? ($k_c = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- A 0.72 N
B 7.2 N
C $7.2 \times 10^{12} \text{ N}$
D $3.1 \times 10^{-3} \text{ N}$
- 46 Consider a thundercloud that has an electric charge of 80.0 C near the top of the cloud and -80.0 C near the bottom of the cloud. These charges are separated by about 1.0 km. What is the magnitude of the electric force between these two sets of charges? ($k_c = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- A $5.8 \times 10^{13} \text{ N}$
B $5.8 \times 10^{10} \text{ N}$
C $3.6 \times 10^6 \text{ N}$
D $5.8 \times 10^7 \text{ N}$
- 47 A repelling force occurs between two charged objects when
- A charges are of unlike signs.
B charges are of like signs.
C charges are of equal magnitude.
D charges are of unequal magnitude.
- 48 If the measured resistance of a lamp is $20. \Omega$ when it operates at a power of 80.0 W, what is the current in the lamp?
- A 16 A
B 0.50 A
C 2.0 A
D 4.0 A
- 49 If a lamp has a resistance of $100. \Omega$ when it operates at a power of $1.00 \times 10^2 \text{ W}$, what is the potential difference across the lamp?
- A 100. V
B 1000. V
C 10000 V
D 220 V

- 50 If a 400. W heater has a current of 2.0 A, what is the resistance of the heating element?
- A $100. \Omega$
B 200Ω
C 800Ω
D 402Ω
- 51 Which of the following wires would have the *greatest* resistance?
- A an aluminum wire 10 cm in length and 3 cm in diameter
B an aluminum wire 5 cm in length and 3 cm in diameter
C an aluminum wire 10 cm in length and 5 cm in diameter
D an aluminum wire 5 cm in length and 5 cm in diameter
- 52 The amount of charge that moves through the filament of a lightbulb in 2.00 s is 4.00 C. What is the current in the lightbulb?
- A 2.00 A
B 8.00 A
C 0.500 A
D 6.00 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
B 20 C
C 2 C
D 0.005 C



- 54 What is the equivalent resistance for the resistors in the figure above?
- A 2.3Ω
B 5.2Ω
C 13Ω
D 22Ω



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

A $0.59\ \text{A}$
 B $6.2\ \text{A}$
 C $6.0\ \text{A}$
 D $24\ \text{A}$

Universal Gravity $G = 6.673 \times 10^{-11}\ \text{N}\cdot\text{m}^2/\text{kg}^2$

$$F_g = G \frac{m_1 m_2}{r^2}$$

- 56 Which of the following equations is the proper rearrangement of the universal gravity equation, solved for the distance between the two objects?

A $r = \sqrt{\frac{m_1 m_2}{GF}}$

B $r = \sqrt{\frac{Gm_1 m_2}{F}}$

C $F = G \frac{m_1 m_2}{r^2}$

D $r = \frac{Gm_1 m_2}{F}$

- 57 The gravitational force between two masses is $54\ \text{N}$. What is the gravitational force if the distance between them is tripled?

A $162\ \text{N}$
 B $9.0\ \text{N}$
 C $6.0\ \text{N}$
 D $18\ \text{N}$

- 58 Two small masses that are $20.0\ \text{cm}$ apart attract each other with a force of $10.0\ \text{N}$. When they are $5.0\ \text{cm}$ apart, these masses will attract each other with what force?

A $5.0\ \text{N}$
 B $0.63\ \text{N}$
 C $160.\text{N}$
 D $40.0\ \text{N}$

**Physics spring practice final
Answer Section****MULTIPLE CHOICE**

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

35	ANS: A	PTS: 1
36	ANS: B	PTS: 1
37	ANS: A	PTS: 1
38	ANS: C	PTS: 1
39	ANS: A	PTS: 1
40	ANS: C	PTS: 1
41	ANS: D	PTS: 1
42	ANS: B	PTS: 1
43	ANS: D	PTS: 1
44	ANS: C	PTS: 1
45	ANS: B	PTS: 1
46	ANS: D	PTS: 1
47	ANS: B	PTS: 1
48	ANS: C	PTS: 1
49	ANS: A	PTS: 1
50	ANS: A	PTS: 1
51	ANS: A	PTS: 1
52	ANS: A	PTS: 1
53	ANS: C	PTS: 1
54	ANS: B	PTS: 1
55	ANS: B	PTS: 1
56	ANS: B	PTS: 1
57	ANS: C	PTS: 1
58	ANS: C	PTS: 1