
XIX. Introductory Physics, High School

High School Introductory Physics Test

The spring 2009 high school MCAS Introductory Physics test was based on learning standards in the Physics content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2006). These learning standards appear on pages 74–77 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

In test item analysis reports and on the Subject Area Subscore pages of the MCAS *School Reports* and *District Reports*, Introductory Physics test results are reported under the following four MCAS reporting categories:

- Motion and Forces
- Heat and Heat Transfer
- Waves and Radiation
- Electromagnetism

Test Sessions

The MCAS high school Introductory Physics test included two separate test sessions, which were administered on consecutive days. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

Each student taking the high school Introductory Physics test was provided with an Introductory Physics Formula Sheet. A copy of this formula sheet follows the final question in this chapter.

Each student also had sole access to a calculator with at least four functions and a square-root key.

The use of bilingual word-to-word dictionaries was allowed for current and former limited English proficient students only, during both Introductory Physics test sessions. No other reference tools or materials were allowed.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

Introductory Physics

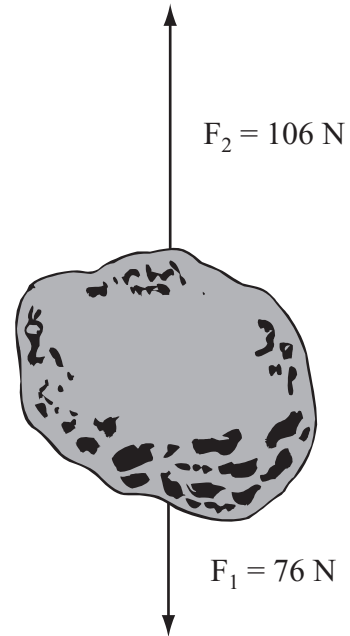
SESSION 1

DIRECTIONS

This session contains twenty-one multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

- 1 Which of the following is the **best** example of work being done on an object?
- A. holding a 50 kg barbell
 - B. lifting a bag of groceries
 - C. keeping a board in place
 - D. pushing on a car that will not move

- 2 The diagram below shows the forces acting on a rock.



The weight of the rock is 76 N. An upward force of 106 N is exerted on the rock. What is the net force acting on the rock?

- A. 30 N upward
- B. 76 N downward
- C. 106 N upward
- D. 182 N downward

3 Which of the following statements **best** explains why there is no change in temperature once thermal equilibrium between two objects in contact is reached?

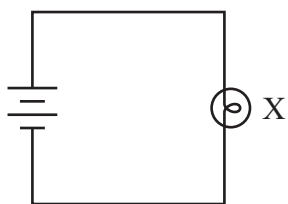
- A. Heat can flow between two objects in contact.
- B. Heat does not flow between objects in contact at the same temperature.
- C. Heat does not flow spontaneously from a cooler object to a warmer object.
- D. Heat flows by conduction, convection, and radiation when the temperatures are the same.

4 A large spring is stretched horizontally between two people. One person wiggles the spring up and down at one end. The up-and-down vibration then moves along the spring to the other person.

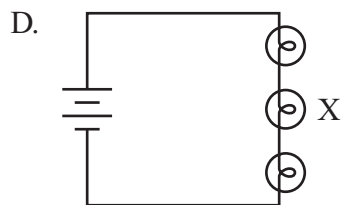
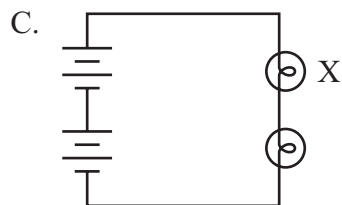
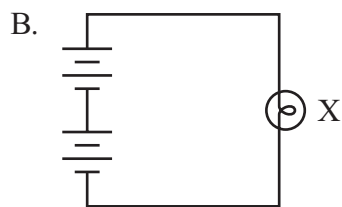
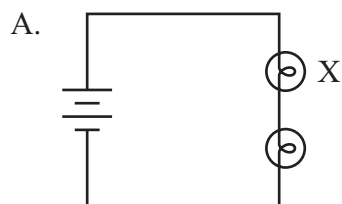
Which of the following types of wave is created in the spring?

- A. pressure wave
- B. transverse wave
- C. longitudinal wave
- D. nonmechanical wave

- 5 A simple circuit is shown in the diagram below.



In which of the following circuits will bulb X have the same brightness as in the circuit above, if all batteries and all light bulbs are identical?



- 6 Which of the following statements **best** describes the visible spectrum of light as seen by the human eye?

- A. The lowest frequency appears red, and the highest frequency appears violet.
- B. The lowest frequency appears red, and the highest frequency appears yellow.
- C. The lowest frequency appears green, and the highest frequency appears violet.
- D. The lowest frequency appears green, and the highest frequency appears yellow.

- 7 To locate objects in their environments, bats in flight and porpoises under water both use ultrasound waves with frequencies that are beyond human hearing. These animals produce an ultrasonic wave and then detect echoes from nearby objects.

If a porpoise and a bat both produce ultrasonic waves when they are 16 m from an object, which animal would hear its echo first and why?

- A. The bat would hear its echo first because sound travels faster in air than in water.
- B. The porpoise would hear its echo first because sound travels faster in water than in air.
- C. The bat would hear its echo first because the amplitude of sound waves is greater in air than in water.
- D. The porpoise would hear its echo first because the amplitude of sound waves is greater in water than in air.

- 8 The table below shows data from a heating experiment.

Metal	Heat Added (J)	Mass of Metal (g)	Change in Temperature ($^{\circ}\text{C}$)
copper	3000	100	77
iron	3000	100	64
lead	3000	100	231
silver	3000	100	130

Which of the following conclusions is supported by the data in the table?

- A. A given mass of silver requires less heat to change its temperature 1°C than an equal mass of iron.
- B. A given mass of silver requires less heat to change its temperature 1°C than an equal mass of lead.
- C. A given mass of copper requires less heat to change its temperature 1°C than an equal mass of lead.
- D. A given mass of copper requires less heat to change its temperature 1°C than an equal mass of silver.

- 9 Which of the following statements **best** explains why drops of liquid form on the outside of a glass of ice water on a hot day?
- A. Water molecules in the air are attracted to the surface of the glass.
 - B. Water molecules in the ice water lose energy as they transfer heat to the air.
 - C. Water molecules in the air lose energy as they transfer heat to the cold glass.
 - D. Water molecules in the ice water move through the glass pores to the outside of the glass.
- 10 Which of the following observations is a result of the Doppler effect?
- A. Noise from across a lake is louder at night than during the day.
 - B. A person walking notices that the pitch of a car's engine decreases as the car passes by.
 - C. Beats are produced when two tuning forks with different frequencies are heard together.
 - D. A person hears the sound from a radio more clearly in certain areas of a room than in others.
- 11 Electromagnetic waves of various frequencies reach Earth from distant parts of the universe. Which of the following can be inferred from this?
- A. The wavelengths must be very short.
 - B. A single material must fill all of space.
 - C. These waves can travel without a medium.
 - D. The speed of these waves is 300,000,000 m/s.

Question 12 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 12 in the space provided in your Student Answer Booklet.

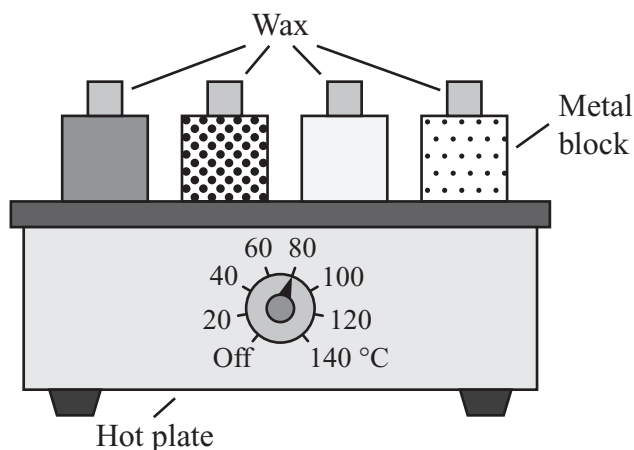
- 12** An attractive force is responsible for keeping satellites in orbit around Earth. The table below gives the masses of seven satellites and the distances between each of these satellites and the center of Earth.

Satellite	Mass (kg)	Distance between Satellite and Center of Earth (km)
1	50	7,000
2	100	14,000
3	200	7,000
4	200	14,000
5	400	14,000
6	400	28,000
7	800	28,000

- Identify the attractive force that holds satellites in orbit.
- Explain why satellite 3 does not experience the same amount of attractive force as satellite 1.
- Identify one other satellite that experiences the same amount of attractive force as satellite 4, and explain why satellite 4 and the satellite you identified experience the same attractive force.

Mark your answers to multiple-choice questions 13 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

- 13 A student places four identically sized metal blocks on a hot plate at 80°C. Then the student places an identical piece of wax on top of each block, as shown in the diagram below.



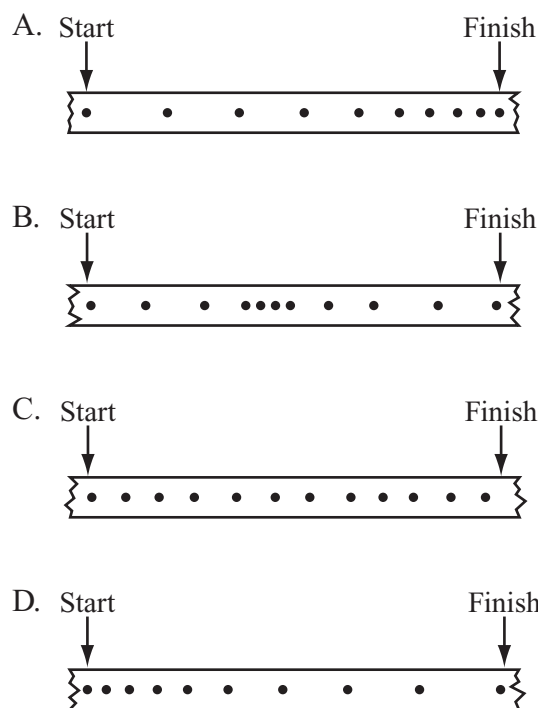
Key			
Iron	Brass	Copper	Aluminum

The student measures the time it takes for the piece of wax on each block to melt. Which of the following questions is being studied in this experiment?

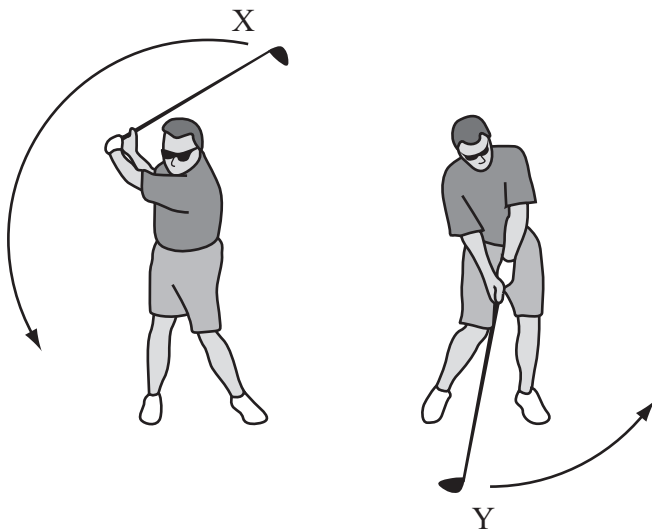
- A. What is the melting point of the wax?
- B. What is the melting point of each metal?
- C. Which metal radiates heat the best?
- D. Which metal conducts heat the best?

- 14 A car has an oil drip. As the car moves, it drips oil at a regular rate, leaving a trail of spots on the road.

Which of the following diagrams of the car's trail of spots shows the car continuously slowing down?



- 15 The diagrams below show a man swinging a golf club.



The kinetic energy of the golf club at point Y is more than the potential energy of the club at point X. Which of the following statements **best** explains why this fact does not violate the law of conservation of energy?

- A. Gravity is constant from point X to point Y.
- B. Air resistance is greater at point Y than at point X.
- C. Acceleration due to gravity is greater at point Y than at point X.
- D. Energy is added by the man to the golf club from point X to point Y.

- 16 Which of the following is an example of a vector quantity?

- A. A student walks 2.0 km north.
- B. An object has a mass of 10.5 kg.
- C. A 1.0 kg object moves at 18 m/s.
- D. A ball has an instantaneous speed of 15 m/s.

- 17 Which of the following would be an advantage of using a 42 V battery in a car instead of a 12 V battery?

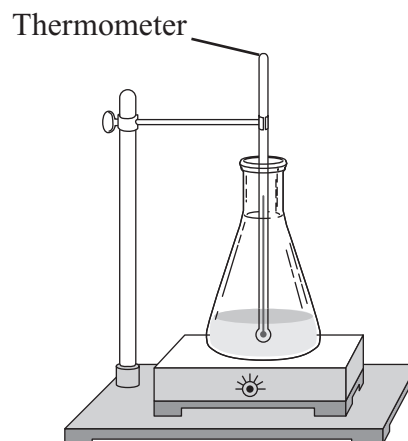
- A. It would allow carmakers to use fewer circuits.
- B. It would eliminate the use of generators and alternators.
- C. It would produce the same amount of power using less current.
- D. It would produce the same amount of power using more current.

- 18 A balloon is rubbed against a sweater. Which of the following occurs because of the rubbing?
- A. destruction of charged particles on the balloon
 - B. release of charged particles from the air in the balloon
 - C. movement of negatively charged particles from one material to the other
 - D. movement of positively charged particles from one material to the other
- 19 A toy cart that has a weight of 10 N moves with a constant velocity of 2 m/s to the right on a horizontal table. According to Newton's laws of motion, which of the following statements is correct?
- A. The table exerts a force of 10 N upward on the toy cart.
 - B. The toy cart exerts a force of 10 N upward on the table.
 - C. The toy cart exerts a force of 2 N downward on the table.
 - D. The table exerts a force of 2 N to the right on the toy cart.

- 20 The speed of sound in a particular gas is 900 m/s. A sound wave propagating in this material has a wavelength of 15 m.
- What is the frequency of this sound?
- A. 30 Hz
 - B. 60 Hz
 - C. 6,800 Hz
 - D. 13,500 Hz

- 21 Which of the following statements best describes an electromagnetic wave with a long wavelength?
- A. It has a low frequency and can travel in a vacuum.
 - B. It has a high frequency and can travel in a vacuum.
 - C. It has a low frequency and can only travel in a medium.
 - D. It has a high frequency and can only travel in a medium.

- 22 The figure below represents water in a flask being heated by a hot plate.



Which of the following actions will slow down the rate of temperature increase of the water in the flask?

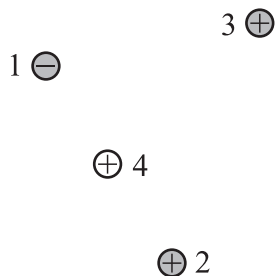
- A. covering the flask with a piece of foil
- B. adding more water at room temperature
- C. increasing the temperature of the hot plate
- D. reducing the amount of water being heated

Question 23 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 23 in the space provided in your Student Answer Booklet.

- 23** In the diagram below, shaded circles 1, 2, and 3 represent fixed charged objects, and circle 4 represents a charged object that is free to move. The magnitude of all the charges is equal.



- Describe how charged objects 1, 2, and 3 will **each** affect object 4.
- Compare the magnitude of the electric force between object 3 and object 4 with the magnitude of the electric force between object 2 and object 4.
- Draw a diagram to show where object 4 will most likely move in relation to fixed objects 1, 2, and 3. Explain your answer.

Introductory Physics

SESSION 2

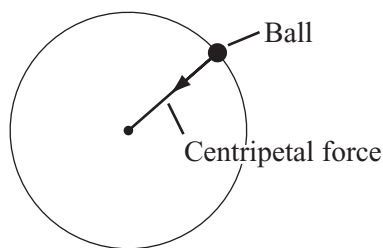
DIRECTIONS

This session contains nineteen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

- 24 A man applies a force of 100 N to a rock for 60 seconds, but the rock does not move. What is the amount of work done by the man on the rock?

A. 0.0 J
B. 6.0 J
C. 100 J
D. 6000 J

- 25 The diagram below shows a ball moving in a circular path.



Which of the following would cause the ball to fly off in a straight-line path?

- A. decreasing the mass of the ball
B. changing the velocity of the ball
C. increasing the radius of the ball's path
D. removing the centripetal force on the ball

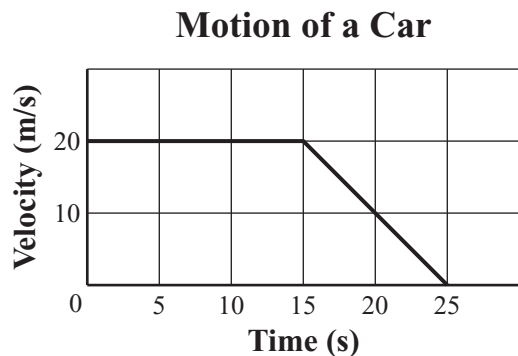
- 26 Four students of different weights timed themselves walking up a set of stairs. Their data are shown below.

Student	Student Weight (N)	Stair Height (m)	Time (s)
W	440	4.0	15.5
X	550	4.0	22.0
Y	410	4.0	15.8
Z	575	4.0	23.0

Which student used the **most** power while walking up the stairs?

- A. student W
B. student X
C. student Y
D. student Z

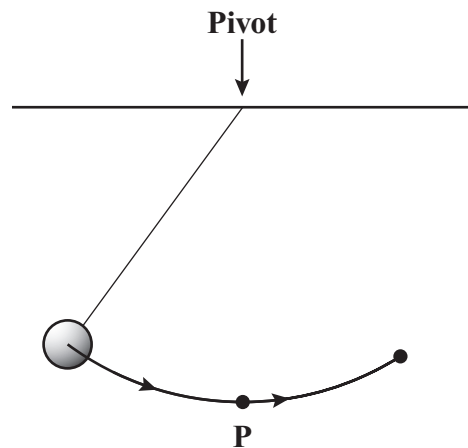
- 27 The graph below shows velocity measurements made as a car moved north for 25 s.



How far did the car move during the first 15 s of the trip?

- A. 20 m
- B. 25 m
- C. 300 m
- D. 500 m

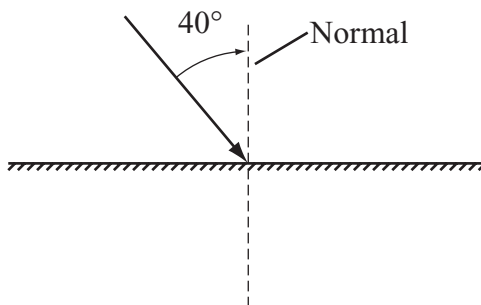
- 28 The figure below represents a pendulum's motion with the lowest point of its swing labeled P.



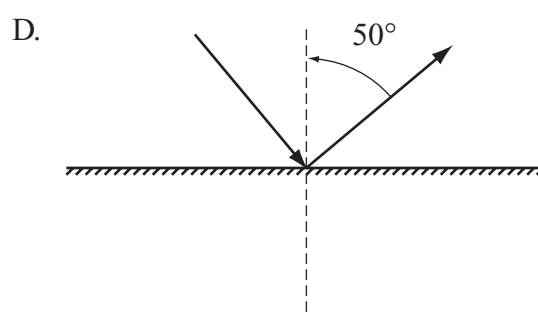
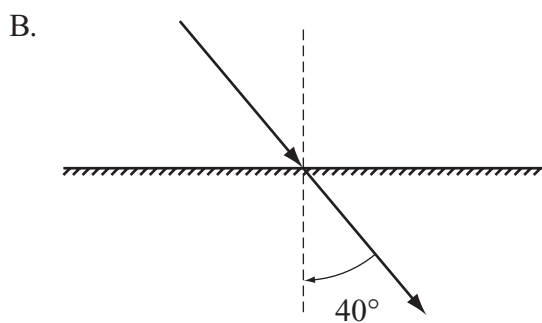
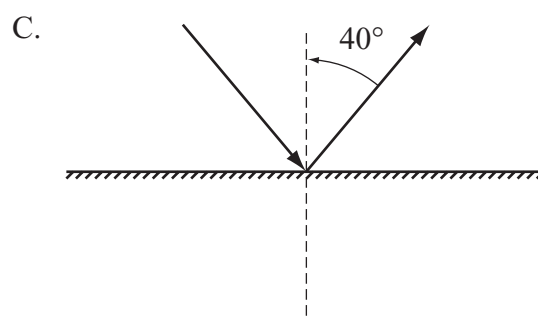
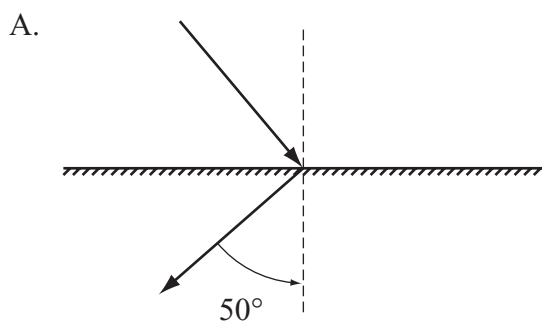
What happens to most of the pendulum's gravitational potential energy as it reaches the lowest point P?

- A. It is transformed into inertia.
- B. It is transformed into kinetic energy.
- C. It is transformed into thermal energy.
- D. It is transformed into chemical energy.

- 29 The diagram below shows a light ray striking a plane mirror surface at an angle of 40° to the normal.



Which of the following diagrams shows the ray that is reflected from the plane mirror surface?



- 30 In an electromagnetic wave, an electric field exists perpendicular to a magnetic field, and both fields are perpendicular to the direction of travel of the wave. These characteristics indicate that an electromagnetic wave is which of the following wave types?
- A. gravitational
 - B. longitudinal
 - C. mechanical
 - D. transverse
- 31 Large amounts of current can damage a circuit. Which of the following changes in a series circuit will result in an increase in current?
- A. The voltage is halved and the resistance is halved.
 - B. The voltage is halved and the resistance is doubled.
 - C. The voltage is doubled and the resistance is halved.
 - D. The voltage is doubled and the resistance is doubled.

Question 32 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 32 in the space provided in your Student Answer Booklet.

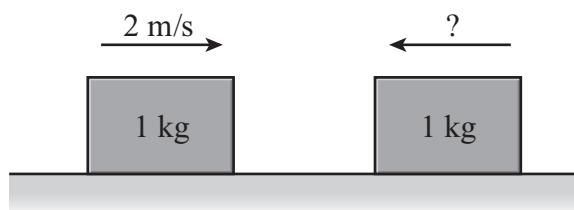
- 32 In a room at 21°C , 60 mL of water is poured into each of three cups. The water in cup 1 is at 15°C , the water in cup 2 is at 25°C , and the water in cup 3 is at 45°C .
- a. Describe what happens to the temperature of the water in **each** cup over a one-hour period.
 - b. Describe what happens to the energy present in **each** cup over the one-hour period and explain why.
 - c. Explain how equilibrium is reached in the cups.

Mark your answers to multiple-choice questions 33 through 43 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

33 Based on Ohm's law, which of the following statements explains what must happen when the voltage across a resistor is decreased?

- A. The resistance of the resistor increases.
- B. The resistance of the resistor decreases.
- C. The current through the resistor increases.
- D. The current through the resistor decreases.

34 A 1 kg block sliding to the right on a level, frictionless surface with a speed of 2 m/s collides and sticks to a second 1 kg block sliding to the left.



After the collision, the blocks are motionless. What was the speed of the second 1 kg block before the collision?

- A. 1 m/s
- B. 2 m/s
- C. 3 m/s
- D. 4 m/s

35 Which of the following is an example of a nonharmonic motion?

- A. particles colliding with one another
- B. a pendulum swaying back and forth
- C. a child bouncing up and down on a large spring
- D. waves created on the surface of a glass of water during an earthquake

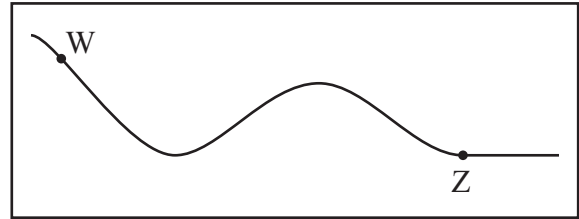
36 A ball has a mass of 0.1 kg and an initial velocity of 20 m/s. The ball is given an acceleration of 30 m/s^2 for 5 s. What is the net force on the ball during acceleration?

- A. 0 N
- B. 3 N
- C. 10 N
- D. 15 N

37 Which of the following has the greatest momentum?

- A. a 60 kg deer moving west at a speed of 16.4 m/s
- B. a 6300 kg elephant moving east at a speed of 0.11 m/s
- C. a 0.42 kg soccer ball moving downfield at a speed of 12 m/s
- D. a 0.03 kg arrow moving toward a target at a speed of 150 m/s

38 The diagram below shows the path of a student on a sled starting from rest at point W.

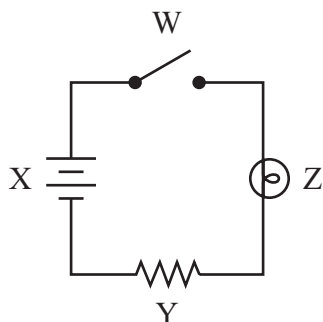


The student slides down a frictionless, snow-covered hill past point Z, which is at ground level.

Which of the following statements **best** describes the energy of the student and sled from point W to point Z?

- A. The total energy at point W is less than at point Z.
- B. The total energy at point W is greater than at point Z.
- C. The potential energy at point W becomes all kinetic energy at point Z.
- D. The kinetic energy at point W becomes all potential energy at point Z.

39 A circuit diagram is shown below.



Which component in the diagram converts chemical energy into electrical energy?

- A. component W
- B. component X
- C. component Y
- D. component Z

40 An electrostatic paint sprayer is used to spray paint evenly onto the surface of a car. Before the paint is sprayed, the car body is given a positive charge and the paint droplets are given a negative charge. The paint droplets experience an attractive force as soon as they are released from the sprayer. The paint droplets are originally sprayed at a distance of 30 cm from the car body, as shown below.



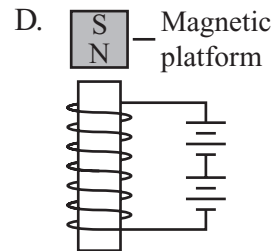
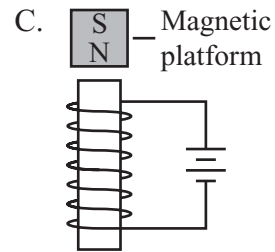
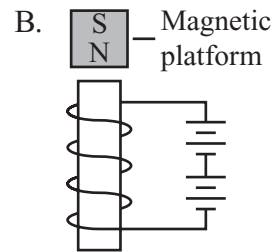
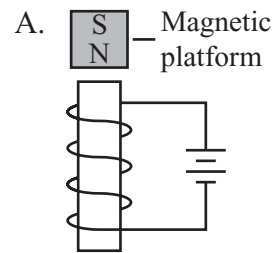
Which of the following changes will cause the **largest increase** in the attractive force on the paint droplets?

- A. The charge on the car body is doubled.
- B. The charge on the paint droplets is doubled.
- C. The distance between the paint droplets and the car body is halved.
- D. The distance between the paint droplets and the car body is doubled.

- 41 Which of the following is an example of an electromagnetic wave?
- A. a radio wave
 - B. a water wave
 - C. the oscillation of a spring
 - D. the vibration of a violin string

- 42 Precise measuring instruments require shock absorbers to eliminate small vibrations that can affect the results of an experiment. One type of shock absorber that can be used is an electromagnet that repels a magnetic platform placed above it.

Which of the following setups would provide the greatest lift to the platform?



- 43 Which of the following statements **best** explains why it is usually easier to keep a sliding object moving than it is to start the object moving?
- A. Kinetic friction is typically equal to static friction.
 - B. Kinetic friction is typically less than static friction.
 - C. Kinetic friction is a force that resists attempts to start an object moving.
 - D. Kinetic friction is a force that opposes the sliding of two objects over each other.

Questions 44 and 45 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 44 in the space provided in your Student Answer Booklet.

- 44 Two athletes are lifting weights. Athlete X lifts 445 N a distance of 2 m in 4 s. Athlete Y lifts 445 N a distance of 2 m in 1 s. Assume that each athlete lifts the weights over his head the same distance from the floor.
- Calculate the amount of work each athlete does. Show your calculations and include units in your answer.
 - Compare the amounts of work done by the two athletes. Explain your answer.
 - Calculate the power **each** athlete uses. Show your calculations and include units in your answer.
 - Compare the power used by athlete X with the power used by athlete Y. Explain your answer.

Write your answer to question 45 in the space provided in your Student Answer Booklet.

45 Rita and John stand at opposite ends of a long section of steel track from an abandoned railroad line. Rita places a penny on her end of the track. John then strikes his end of the track with a rock.

a. Describe what Rita sees happen to the penny on the track and explain her observation.

Rita puts her ear on the track. John strikes his end of the track with the rock again.

b. Describe the difference in speed between the sound Rita hears in the air and the sound she hears through the track.

c. With the rock, John strikes his end of the track harder than before. Identify which sound wave property he has changed.



Massachusetts Comprehensive Assessment System

Introductory Physics Formula Sheet

Formulas

$$\text{Average Speed} = \frac{d}{\Delta t}$$

$$F = ma$$

$$p = mv$$

$$\text{Average Acceleration} = \frac{\Delta v}{\Delta t}$$

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

$$V = IR$$

$$\text{Average Velocity} = \frac{\Delta x}{\Delta t}$$

$$F = k \frac{q_1 q_2}{d^2}$$

$$P = IV$$

$$v_f = v_i + a\Delta t$$

$$KE = \frac{1}{2}mv^2$$

$$Q = mc\Delta T$$

$$\Delta x = v_i \Delta t + \frac{1}{2}a \Delta t^2$$

$$PE = mg\Delta h$$

$$v = f\lambda$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$W = Fd$$

$$\lambda = \frac{c}{f}$$

$$\text{Average Velocity} = \frac{v_i + v_f}{2}$$

$$P = \frac{W}{\Delta t}$$

$$T = \frac{1}{f}$$

Variables

a = acceleration	q = charge of particle
c = specific heat	Q = heat
d = distance	R = resistance
f = frequency	Δt = change in time
F = force	ΔT = change in temperature
Δh = change in height	T = period
I = current	v = velocity
KE = kinetic energy	v_i = initial velocity
λ = wavelength	v_f = final velocity
m = mass	Δv = change in velocity
p = momentum	V = voltage
P = power	W = work
PE = gravitational potential energy	Δx = displacement

Definitions

c = speed of electromagnetic waves = 3.00×10^8 m/s

G = Universal gravitational constant = $6.67 \times 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{kg}^2}$

k = Coulomb constant = $8.99 \times 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2}$

$g \approx 10 \text{ m/s}^2$ $1 \text{ N} = 1 \frac{\text{kg} \cdot \text{m}}{\text{s}^2}$ $1 \text{ J} = 1 \text{ N} \cdot \text{m}$ $1 \text{ W (watt)} = 1 \frac{\text{J}}{\text{s}}$

High School Introductory Physics
Spring 2009 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	290	<i>Motion and Forces</i>	2.3	B
2	290	<i>Motion and Forces</i>	1.5	A
3	291	<i>Heat and Heat Transfer</i>	3.2	B
4	291	<i>Waves and Radiation</i>	4.3	B
5	292	<i>Electromagnetism</i>	5.3	C
6	292	<i>Waves and Radiation</i>	6.2	A
7	293	<i>Waves and Radiation</i>	4.5	B
8	293	<i>Heat and Heat Transfer</i>	3.4	A
9	294	<i>Heat and Heat Transfer</i>	3.3	C
10	294	<i>Waves and Radiation</i>	4.6	B
11	294	<i>Waves and Radiation</i>	4.2	C
12	295	<i>Motion and Forces</i>	1.7	
13	296	<i>Heat and Heat Transfer</i>	3.1	D
14	296	<i>Motion and Forces</i>	1.2	A
15	297	<i>Motion and Forces</i>	2.1	D
16	297	<i>Motion and Forces</i>	1.1	A
17	297	<i>Electromagnetism</i>	5.5	C
18	298	<i>Electromagnetism</i>	5.1	C
19	298	<i>Motion and Forces</i>	1.4	A
20	298	<i>Waves and Radiation</i>	4.1	B
21	299	<i>Waves and Radiation</i>	6.2	A
22	299	<i>Heat and Heat Transfer</i>	3.4	B
23	300	<i>Electromagnetism</i>	5.4	
24	301	<i>Motion and Forces</i>	2.3	A
25	301	<i>Motion and Forces</i>	1.8	D
26	301	<i>Motion and Forces</i>	2.4	A
27	302	<i>Motion and Forces</i>	1.3	C
28	302	<i>Motion and Forces</i>	2.2	B
29	303	<i>Waves and Radiation</i>	4.4	C
30	304	<i>Waves and Radiation</i>	6.1	D
31	304	<i>Electromagnetism</i>	5.2	C
32	305	<i>Heat and Heat Transfer</i>	3.2	
33	306	<i>Electromagnetism</i>	5.2	D
34	306	<i>Motion and Forces</i>	2.5	B
35	306	<i>Waves and Radiation</i>	4.1	A
36	306	<i>Motion and Forces</i>	1.4	B
37	307	<i>Motion and Forces</i>	2.5	A
38	307	<i>Motion and Forces</i>	2.1	C
39	308	<i>Electromagnetism</i>	5.3	B
40	308	<i>Electromagnetism</i>	5.4	C
41	309	<i>Waves and Radiation</i>	4.2	A
42	309	<i>Electromagnetism</i>	5.6	D

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
43	310	<i>Motion and Forces</i>	1.6	B
44	311	<i>Motion and Forces</i>	2.4	
45	312	<i>Waves and Radiation</i>	4.5	

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's website later this year.