

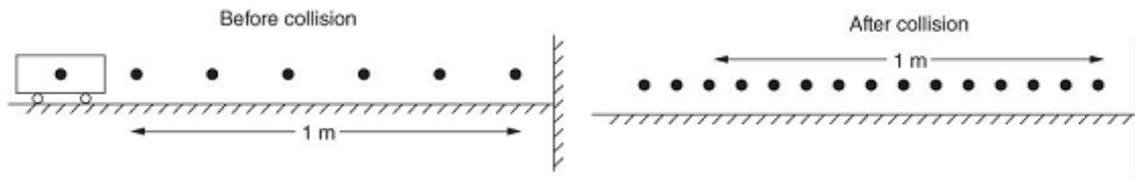
In Class Practice Multiple Choice AP Exam

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) A swimmer is able to propel himself forward through the water by moving his arms. Which of the following correctly states the applicant and recipient of the force responsible for the swimmer's forward acceleration? 1) _____
- A) The force of the swimmer's arms on the surrounding water
 - B) The force of the swimmer's arms on the swimmer's torso
 - C) The force of the surrounding water on the swimmer's arms
 - D) The force of the swimmer's torso on the swimmer's arms

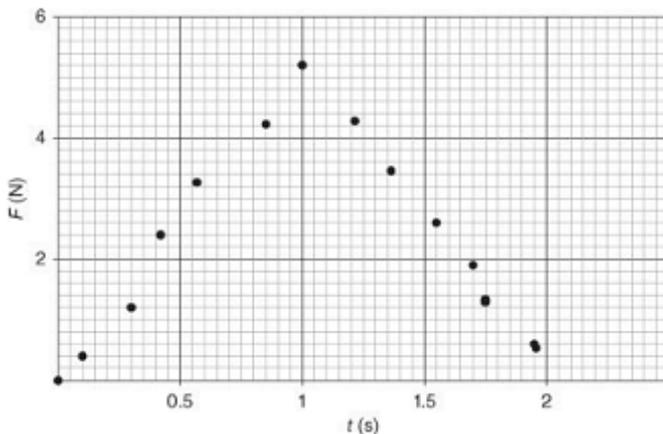
- 2) The radius of Mars is about half that of Earth; the mass of Mars is about one-tenth that of Earth. Which of the following is closest to the gravitational field at the surface of Mars? 2) _____
- A) 2 N/kg
 - B) 0.5 N/kg
 - C) 4 N/kg
 - D) 10 N/kg

- 3) The next image applies to questions 3 & 4: 3) _____
- In the laboratory, a 0.5-kg cart collides with a fixed wall, as shown in the preceding diagram. The collision is recorded with a video camera that takes 20 frames per second. A student analyzes the video, placing a dot at the center of mass of the cart in each frame. The analysis is shown below.



- About how fast was the cart moving before the collision?
- A) 0.25 m/s
 - B) 0.20 m/s
 - C) 4.0 m/s
 - D) 5.0m/s
- 4) Which of the following best estimates the change in the cart's momentum during the collision? 4) _____
- A) 13 N•s
 - B) 27 N•s
 - C) 1.3 N•s
 - D) 2.7 N•s

- 5) In the laboratory, a 3-kg cart experiences a varying net force. This net force is measured as a function of time, and the data collected are displayed in the graph below. 5) _____



- What is the change in the cart's momentum during the interval $t = 0$ to $t = 2$ s?
- A) 10 N•s
 - B) 15 N•s
 - C) 30 N•s
 - D) 5 N•s

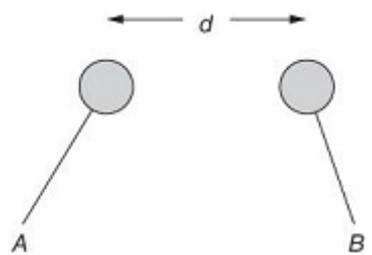
6) A moving 1.5-kg cart collides with and sticks to a 0.5-kg cart which was initially at rest. Immediately after the collision, the carts each have the same _____ as each other. 6) _____
 A) Mass B) Momentum C) Kinetic Energy D) Velocity

7) Three wagons each have the same total mass (including that of the wheels) and four wheels, but the wheels are differently styled. The structure, mass, and radius of each wagon's wheels are shown in the chart. In order to accelerate each wagon from rest to a speed of 10 m/s, which wagon requires the greatest energy input? 7) _____

	Wheel Structure	Wheel Mass	Wheel Radius
Wagon A	solid disk, $I = \frac{1}{2}MR^2$	0.5 kg	0.1 m
Wagon B	solid disk, $I = \frac{1}{2}MR^2$	0.2 kg	0.2 m
Wagon C	hollow hoop, $I = MR^2$	0.2 kg	0.1 m

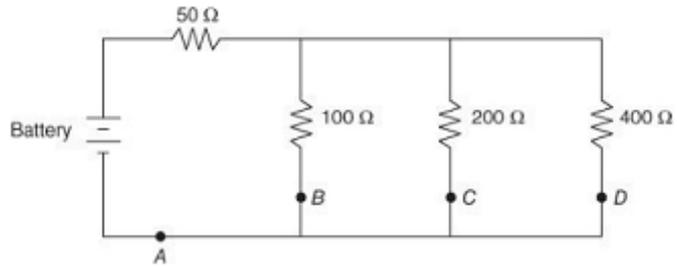
A) Wagon A B) Wagon B C) Wagon C D) All the same

8) Two charged Styrofoam balls are brought a distance d from each other, as shown. The force on Ball B is $2 \mu\text{N}$ to the right. When the distance between the balls is changed, the force on Ball B is $8 \mu\text{N}$ to the right. Which of the following can indicate the sign of the charges of balls A and B? 8) _____



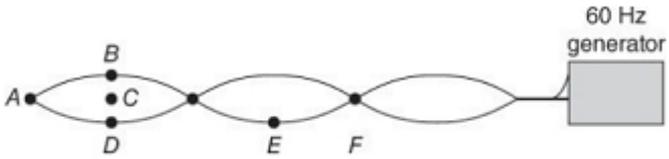
A) Ball A: Neutral
Ball B: Positive B) Ball A: Negative
Ball B: Negative C) Ball A: Positive
Ball B: Negative D) Ball A: Positive
Ball B: Neutral

9) At which position in the above circuit will the current passing that position in one second be largest? 9) _____



A) A B) B C) C D) D

10) In the laboratory, a 60-Hz generator is connected to a string that is fixed at both ends. A standing wave is produced, as shown in the preceding figure. In order to measure the wavelength of this wave, a student should use a meterstick to measure from positions 10) _____



A) D to E B) A to F C) B to C D) B to D

Answer Key

Testname: PRACTICE MC

- 1) C
- 2) C
- 3) C
- 4) D
- 5) D
- 6) D
- 7) B
- 8) B
- 9) A
- 10) B