

M3 Forces in Fluids

Name: _____

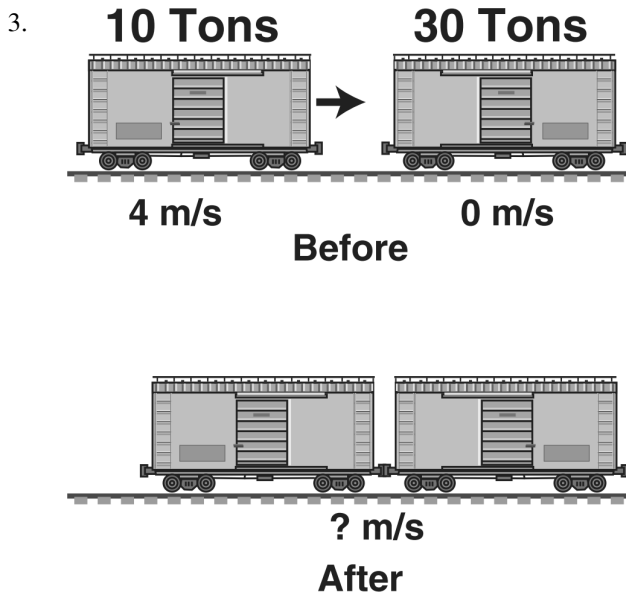
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1. A child is on a sled moving down a hill at $20 \frac{\text{meters}}{\text{second}}$. The combined mass of the sled and child is 100 kilograms. The momentum of the child and sled is

- A. 5 kilogram $\cdot \frac{\text{m}}{\text{s}}$ B. 20 kilogram $\cdot \frac{\text{m}}{\text{s}}$
 C. 1000 kilogram $\cdot \frac{\text{m}}{\text{s}}$ D. 2000 kilogram $\cdot \frac{\text{m}}{\text{s}}$

2. A 70-kg skier leaves a ski jump at a velocity of $14 \frac{\text{m}}{\text{s}}$. What is the skier's momentum at that instant?

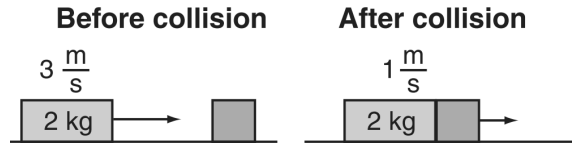
- A. 5 N \cdot s B. 50 N \cdot s
 C. 980 N \cdot s D. 9800 N \cdot s



When these two freight cars of different mass collide and couple, what will be their resultant velocity?

- A. $1 \frac{\text{m}}{\text{s}}$ B. $2 \frac{\text{m}}{\text{s}}$ C. $4 \frac{\text{m}}{\text{s}}$ D. $8 \frac{\text{m}}{\text{s}}$

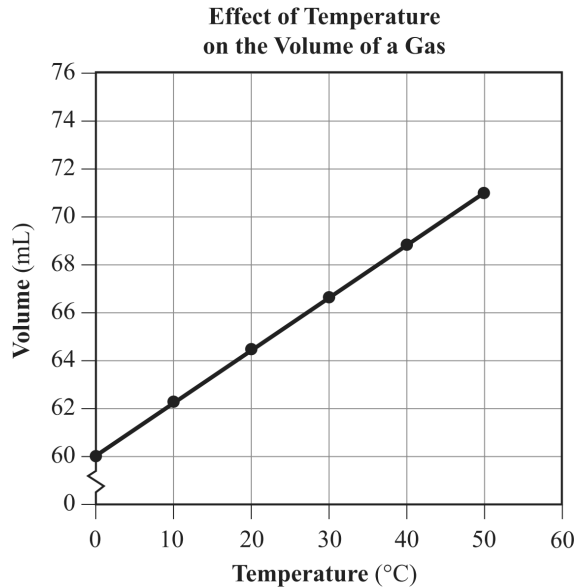
4. The diagram depicts a 2-kg mass colliding with and sticking to a second box.



What is the mass of the second box?

- A. 4 kg B. 6 kg C. 8 kg D. 9 kg
5. What is the mass of an asteroid with a speed of 200 m/s and a momentum of $2,000 \text{ kg} \cdot \text{m/s}$?
- A. 10 kg B. 1,800 kg
 C. 2,200 kg D. 400,000 kg
6. The momentum of an object in space is
- A. dependent on its mass.
 B. independent of its inertia.
 C. independent of its velocity.
 D. dependent on its potential energy.
7. An object with a mass of 3 kg has a momentum of $75 \text{ kg} \cdot \text{m/s}$. What is its velocity?
- A. 0.4 m/s B. 7.1 m/s
 C. 25 m/s D. 72 m/s

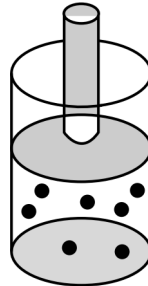
8. The graph below shows the effect of temperature on the volume of a gas.



Which generalization can be made about the relationship between the temperature and volume of a gas?

- A. As the temperature of a gas decreases, its volume increases.
- B. As the temperature of a gas decreases, its volume stays the same.
- C. As the temperature of a gas increases, its volume increases.
- D. As the temperature of a gas increases, its volume stays the same.
9. Methane (CH_4) gas diffuses through air because the molecules are
- A. moving randomly. B. dissolving quickly.
- C. traveling slowly. D. expanding steadily.
10. The volume of 400 mL of chlorine gas at 400 mm Hg is decreased to 200 mL at constant temperature. What is the new gas pressure?
- A. 400 mm Hg B. 300 mm Hg
- C. 800 mm Hg D. 650 mm Hg

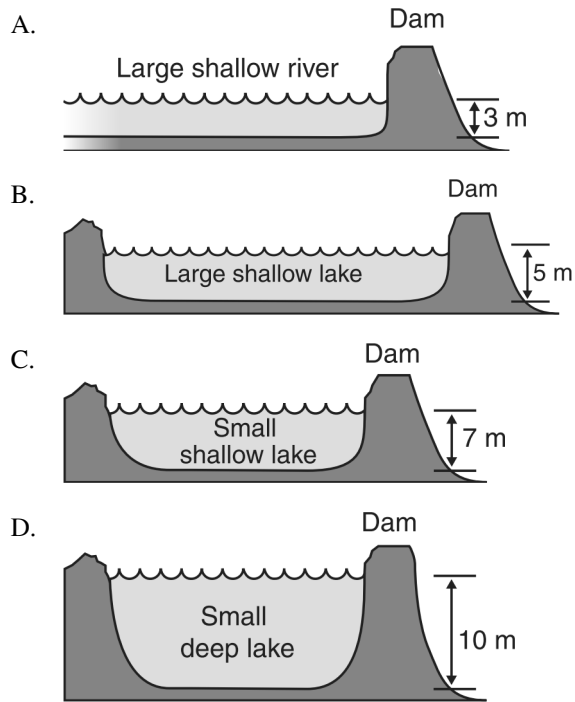
11. Under what circumstance might a gas decrease in volume when heated?
- A. The gas is held constant at STP.
- B. The gas remains under uniform temperature.
- C. The gas is placed under increasing pressure.
- D. The gas undergoes a decrease in pressure.
12. A cylinder of gas particles is shown below.



The cylinder is fitted with a moveable piston that can be raised and lowered. Which of the following would result in an *increase* in the pressure of the gas below the piston?

- A. increasing the volume of the cylinder
- B. removing some of the gas from the cylinder
- C. decreasing the volume of the cylinder
- D. decreasing the pressure outside the cylinder
13. It is not advisable to seek shelter under a highway overpass during a tornado. When air moves through this narrow area, wind speeds increase and pressure decreases. This increases the risk for injuries.
- This phenomenon can be explained by which of the following?
- A. Bernoulli's principle
- B. gravitational force
- C. R-values
- D. shear

14. For which dam is the water pressure *greatest*?



15. How are the atoms in an object affected when the temperature of the object increases?

- A. They join together.
- B. They vibrate faster.
- C. They vibrate slower.
- D. They split apart.