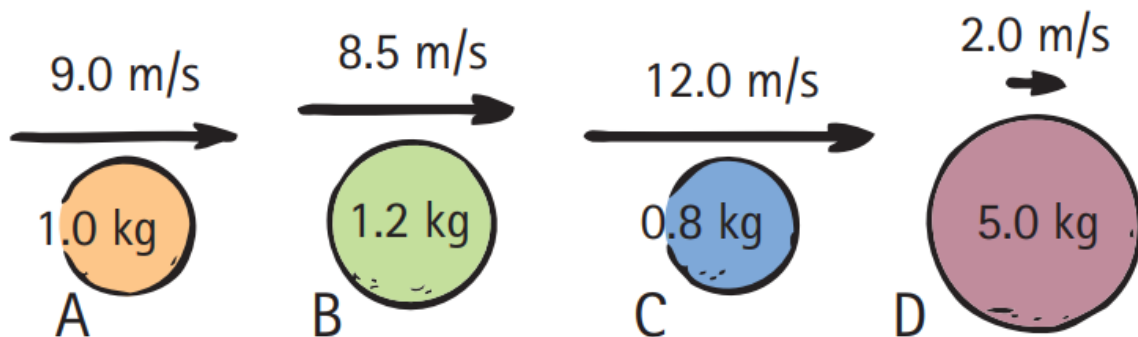


Trắc nghiệm

Q1.

Ý tưởng gần giống câu này:

69. The balls have different masses and speeds. Rank the following from greatest to least: (a) Momentum. (b) The impulses needed to stop the balls.



Q2.

How much work is done on a 250-kg crate that is hoisted 2 m in a time of 4 s?

- A. 7000 J
 - B. 5000 J
 - C. 2000 J
 - D. 500 J
-

Q3.

The acceleration of a vertically-thrown ball at the top of its path is

- A. between zero and 10 m/s^2
 - B. 10 m/s^2
 - C. zero
 - D. dependent on the mass of the ball
-

Q4.

When no air resistance acts on a projectile, its horizontal acceleration is

- A. centripetal
 - B. at right angles to g
 - C. g
 - D. zero
-

Q5.

A freight train rolls along a track with considerable momentum.

If it then rolls at the same speed but has **twice as much mass**, its momentum is now

- A. unchanged
 - B. four times as large
 - C. twice as large
 - D. zero
-

Q6.

A girl pushes a cart to the left with a **180-N** force.

At the same time a boy pushes it to the right with a **75-N** force.

The net force exerted on the cart is:

→ 105 N to the left

Q7.

If both the mass and velocity of an object remain constant, the impulse on the object is

- A. zero
 - B. equal to its momentum
 - C. equal to its kinetic energy
 - D. increasing with time
-

Q8.

Which of the following is a unit of force?

- A. kg
 - B. $\text{kg}\cdot\text{m}/\text{s}^2$
 - C. kg/s
 - D. m/s^2
-

Q9.

You drop a pillow off the edge of the administration building on your campus. While the pillow is falling, its speed

- A. and acceleration both increase
 - B. and acceleration both decrease
 - C. increases and its acceleration decreases
 - D. decreases and its acceleration increases
-

Q10.

A 2-kg ball rolling at 3 m/s bumps into a pillow and comes to a stop in 0.5 s. What average force does the ball exert on the pillow?

- A. 6 N
 - B. 12 N
 - C. 3 N
 - D. 24 N
-

Q11.

Can we use the equation $F_{\text{net}} = \frac{dp}{dt} = ma$ when the mass is constant?

- A. No, because the given equation is applicable for the variable mass only.
 - B. No, because the given equation is not applicable for the constant mass.
 - C. Yes, and the resultant equation is $F = ma$.
 - D. Yes, and the resultant equation is $F = mv$.
-

Q12.

The speed of a vertically-thrown ball at the top of its path is

- A. dependent on the mass of the ball.
 - B. 10 m/s.
 - C. between zero and 10 m/s.
 - D. zero.
-

Q13.

For how long should a force of 50 N be applied to change the momentum of an object by 48 kg·m/s?

- A. 2 s
 - B. 0.96 s
 - C. 16.6 s
 - D. 2400 s
-

Q14.

A 120-N falling object encounters 40 N of air resistance. The net force on it is

- A. 80 N
 - B. 160 N
 - C. 40 N
 - D. 120 N
-

Q15.

When a 15-kg block is simultaneously pushed eastward with 50 N and westward with a force of 15 N, the combination of these forces on the block is

- A. 35 N west
 - B. 35 N east
 - C. 65 N east
 - D. 65 N west
-

Q16.

When you toss a ball upward with a certain initial speed, it reaches a maximum height h after it leaves your hand.

If you throw the ball upward with double the initial speed, the maximum height the ball reaches is

- A. $h/2$
 - B. $8h$
 - C. $4h$
 - D. $2h$
-

Q17.

Which pair of quantities contains both a scalar and a vector?

- A. acceleration and momentum
 - B. charge and resistance
 - C. kinetic energy and mass
 - D. temperature and velocity
-

Q18.

A freely falling object has a speed of 15 m/s at one instant. Exactly 1 s later its speed will be

- A. 40 m/s
- B. 30 m/s

- C. 20 m/s
 - D. 25 m/s
-

Q19.

The reason why a 20-kg rock falls no faster than a 1-kg rock in free fall is that the

- A. force of gravity is the same for both.
 - B. 20-kg rock has greater acceleration.
 - C. force/mass ratio is the same for both.
 - D. 1-kg rock has greater acceleration.
-

Q20.

Considering Newton's third law, why don't two equal and opposite forces cancel out each other?

- A. Because the two forces act on different systems.
 - B. Because the two forces have different magnitudes.
 - C. Because the two forces are applied at different points in space.
 - D. Because one force is always weaker than the other.
-

Tự luận

An airplane is flying horizontally with a speed of **1000 km/h (280 m/s)** when one of its engines falls off.

Neglect air resistance, and assume that it takes **30 s** for the engine to hit the ground.

(a) Show that the altitude of the airplane is **4.4 km**.

(Use $g = 9.8 \text{ m/s}^2$.)

(b) Show that the horizontal distance the engine travels during its fall is **8.4 km**.

(c) If the airplane continues to fly forward at the same speed as though nothing had happened, where is the engine relative to the airplane at the moment it hits the ground?