

CSCA Physics

Practice Test 1

$$\frac{a^2 + b^2}{c^2} = \frac{\sin(x + \dots)}{\cos x \cos \dots}$$

1

Good health is a crucial foundation for a happy life. The Party and the state have always cared deeply about and prioritized the physical well-being of students. The State Sports Commission established the National Physical Fitness Standards, stipulating that male students in their first year of high school achieve a score of 100 points with a 50-meter dash time of 7.1 seconds. For female students in the first year of high school, a 50-meter dash time of 7.8 seconds is required for a perfect score. During a physical fitness test, female student Xiaohong and male student Xiaoming participated in the 50-meter dash test on a standard 400-meter track (the 50-meter dash is a straight-line run).

The displacement of Xiaohong during the test is ()

- A. 0 m
- B. 50 m
- C. 100 m
- D. 400 m

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The traffic sign shown beside the highway indicates that cars must maintain speeds below 100 km/h, while "Hangzhou 88 km" signifies 88 km remaining to Hangzhou.

"100 km/h" and "88 km" respectively refer to ()



- A. Average speed, displacement
- B. Average speed, distance traveled
- C. Instantaneous speed, displacement
- D. Instantaneous speed, distance

3

A particle undergoes uniformly accelerated linear motion. The relationship between displacement and time is given by $x = 5t + 2.5t^2$. The units for x and t are m and s, respectively. The particle's initial velocity and acceleration are ()

- A. 0 and 2.5 m/s^2
- B. 5 m/s and 2.5 m/s^2
- C. 5 m/s and 5 m/s^2
- D. 2.5 m/s and 5 m/s^2

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As shown in the figure, two ships are traveling at constant speeds in the same direction within a certain sea area. During a specific time interval, Ship A suddenly undergoes uniformly accelerated linear motion with constant acceleration, while Ship B maintains uniform linear motion. During this time interval, ()



- A. With Ship A as the reference frame, Ship B moves with uniform linear motion
- B. With Ship B as the reference frame, Ship A undergoes uniformly accelerated linear motion
- C. Describing the positions of both ships on the sea surface requires only a one-dimensional coordinate system
- D. When studying a ship's trajectory on the sea surface, the ship cannot be treated as a point mass

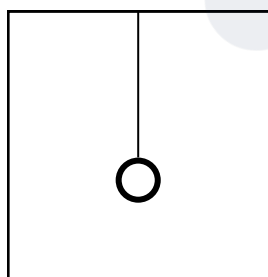
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Under conditions where air resistance is negligible, which of the following statements is correct? ()

- A. For a freely falling ball, the direction of its net external force is identical to its velocity direction
- B. For a ball undergoing projectile motion, the direction of its net external force continuously changes
- C. For a ball moving in a circular path, the direction of its net external force always points toward the center of the circle
- D. The centripetal acceleration of all objects at rest relative to the Earth's surface points toward the Earth's center

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As shown in the figure, a small ball of *mass* m is suspended from the ceiling of an elevator. During the elevator's upward deceleration with an acceleration of magnitude $g/3$, the ball ()



- A. is in a state of weightlessness, experiencing a tensile force of $mg/3$
- B. is weightless, experiencing a pulling force of $2mg/3$
- C. is in a state of superweight, with a tensile force of $mg/3$
- D. is in a state of superweight, with a pulling force of $4mg/3$

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During PE class, students are jumping to touch a height bar under the teacher's guidance. Which of the following statements is correct? ()



- A. During takeoff, the pressure exerted by the person on the ground is greater than the ground's supporting force on the person
- B. During the jump, the pressure exerted by the person on the ground equals the ground's supporting force on the person
- C. After jumping in the picture, the person experiences gravitational force and upward impulse
- D. The ground's supporting force is generated by the deformation of the person's feet

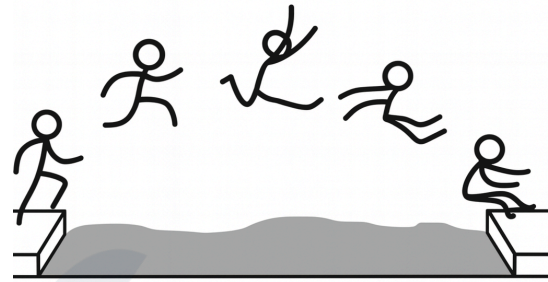
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An object of mass m is suspended from the ceiling of an elevator by a thin rope. When the elevator accelerates vertically upward at $g/6$, the tension exerted by the rope on the object is ()

- A. $1/6 mg$
- B. $5/6 mg$
- C. mg
- D. $7/6 mg$

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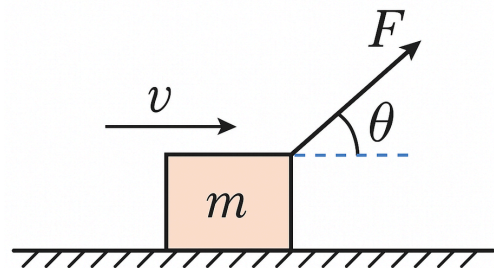
As shown in the figure, during an outdoor competitive recreational activity, a participant jumps with a certain initial velocity and lands directly on the opposite platform. Neglecting air resistance, regarding the entire process from takeoff to landing, then ()



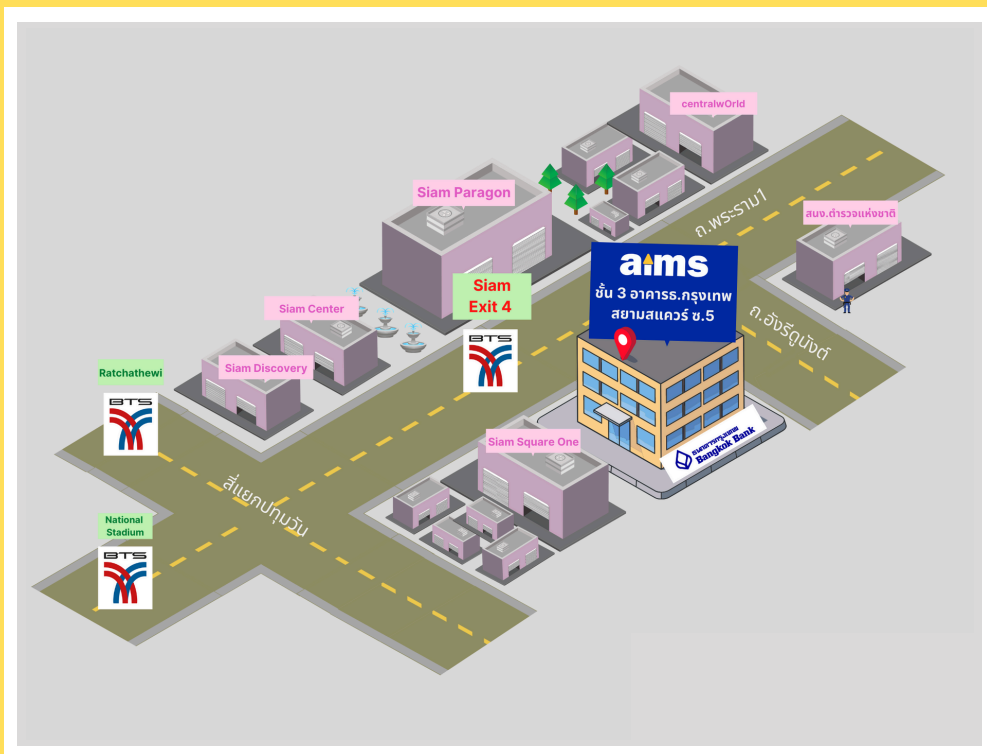
- A. The impulse of the athlete's gravitational force is zero
- B. The athlete's momentum first decreases and then increases
- C. The athlete's mechanical energy first increases and then decreases
- D. The work done by gravity on the participant first increases and then decreases

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As shown in the figure, an object of mass m moves uniformly to the right along the horizontal direction under the action of a force F applied at an angle θ to the horizontal. Given that the magnitude of gravitational acceleration is g , which of the following statements about the impulse exerted on the object during time t is correct? ()



- A. The magnitude of the impulse exerted by the force F is Ft
- B. The magnitude of the impulse of the pulling force F is $Ft \cos\theta$
- C. The magnitude of the impulse of the frictional force is Ft
- D. The magnitude of the impulse due to gravity is zero




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