

Physics

I . Single choice questions

1. Which of the following objects can be approximately regarded as uniform rectilinear motion:

- (A) A train arriving at the station.
- (B) A football that rolls on the grass after leaving one's feet.
- (C) A satellite orbiting the earth at a constant speed.
- (D) Customers who stand on the escalator of the mall.

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2. As shown in Figure 1, an object is subjected to two forces, $F_1=3\text{N}$ horizontally to the left and $F_2=9\text{N}$ horizontally to the right. If an object moves uniformly in a straight line to the right in a horizontal direction, the frictional force acting on the ground is:

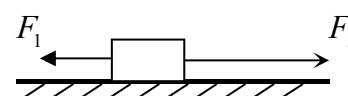


图 1

- (A) The direction is to the left, and the magnitude of the force is 6N.
- (B) The direction is to the left, and the magnitude of the force is 12N.
- (C) The direction is to the right, and the magnitude of the force is 6N.
- (D) The direction is to the right, and the magnitude of the force is 12N.

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3. How much work does gravity do when a 25kg object falls 3.5m? (The acceleration of gravity is 9.8m/s^2)

- (A) 88J
- (B) 875J
- (C) 858J
- (D) 880J

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4. A small car with a mass of 725kg drives eastward at a speed of 20km/h. Please calculate the momentum of this car.

- (A) $1.45 \times 10^3 \text{kg} \cdot \text{m/s}$
- (B) $4.03 \times 10^3 \text{kg} \cdot \text{m/s}$
- (C) $1.45 \times 10^2 \text{kg} \cdot \text{m/s}$
- (D) $4.03 \times 10^2 \text{kg} \cdot \text{m/s}$

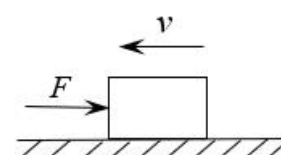
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5. What is the speed of a small car moving at a constant acceleration of 5.0m/s^2 in a straight line from a standstill when it travels 10 meters?

- (A) 5m/s.
- (B) 10m/s.
- (C) 15m/s.
- (D) 20m/s.

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6. An object with a mass of 10kg moves left on a horizontal ground, and the dynamic friction coefficient between the

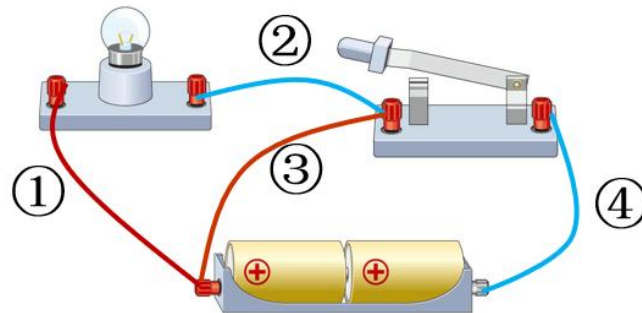


object and the horizontal plane is 0.2. At the same time, the object is subjected to a horizontal push force $F=20\text{N}$ to the right, and the acceleration of the object is ($g=10\text{m/s}^2$):

- (A) 0.
- (B) 4m/s^2 , Direction Horizontal Right.
- (C) 2m/s^2 , Direction Horizontal Right.
- (D) 2m/s^2 , Direction Horizontal Left.

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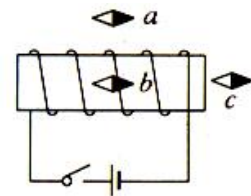
7. Please analyze the following circuit diagram and indicate which wire is connected incorrectly:



- (A) Connection①.
- (B) Connection②.
- (C) Connection③.
- (D) Connection④.

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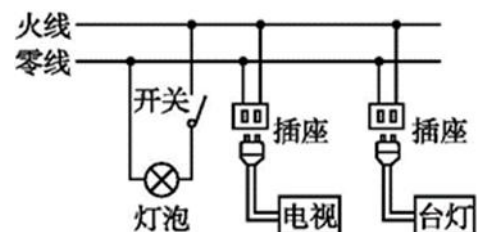
8. As shown in the figure, three small magnetic needles a, b, and c are located directly above, inside, and to the right of the energized solenoid. When these small magnetic needles are stationary, the direction of the N pole of the small magnetic needle is:



- (A) a. Both b and c point to the left.
- (B) a. Both b and c point to the right.
- (C) a points to the left, b points to the right, and c points to the right.
- (D) a points to the right, b points to the left, and c points to the right.

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9. The household circuit can be simplified to the situation shown in the figure. When the light bulb, TV, and desk lamp are all working, the connection method between them is:



- (A) series connection.
- (B) parallel connection.
- (C) TV connected in series with desk lamp and then connected in parallel with light bulb.
- (D) The light bulb is connected in series with the desk lamp and then connected in parallel with the TV.

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10. The definition of electric field strength is $E=F/q$, which of the following statements is correct?

- (A) This definition only applies to the electric field generated by point charges.
- (B) F is the force acting on the test charge, and q is the amount of charge that generates the electric field.
- (C) The direction of the field strength is the same as that of F .
- (D) According to this definition, the magnitude of the electric field force acting on a charge at a certain point in the field is directly proportional to the magnitude of the field strength at that point.

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II. Multiple choice questions (5 questions in total, no marks for incorrect or multiple choices, 2-4 marks for missed choices)

11. Which of the following calculations is correct when an object undergoes a free fall motion and takes the gravitational acceleration $g=10\text{m/s}^2$

- (A) The velocity of the object at the end of 3 seconds is 30m/s .
- (B) The speed of the object at the end of 3 seconds is 60m/s .
- (C) The height at which an object falls within 3 seconds is 90 meters.
- (D) The height at which an object falls within 3 seconds is 45 meters.

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12. Two small balls with masses of m_1 and m_2 collided completely elastically on a smooth horizontal plane. Is the momentum and mechanical energy of a system composed of two small balls conserved before and after collision?

- (A) Conservation of momentum.
- (B) Conservation of mechanical energy.
- (C) Non conservation of momentum.
- (D) Mechanical energy is not conserved.

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13. An object slides uniformly along an inclined plane. How does the kinetic and potential energy of an object change?

- (A) Increased kinetic energy.
- (B) The kinetic energy remains unchanged.
- (C) Potential energy increases.
- (D) The potential energy decreases.

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14. When a glass falls from the same height, it is easier to break on a stone than on a grass.

Which of the following statements is correct regarding the explanation of this phenomenon

(A) Due to the impact between the glass cup and the stone, the momentum of the glass cup is relatively large.

(B) Due to the impact between the glass cup and the stone, the average impact force on the glass cup is relatively high.

(C) Due to the significant change in momentum of the glass cup during the impact process between the glass cup and the stone.

(D) Due to the rapid change in momentum of the glass cup during the impact process between the glass cup and the stone.

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15. Which of the following phenomena is completely formed by the linear propagation of light?

(A) Light shining through the bushes.

(B) Small hole imaging.

(C) Soap bubbles appear colorful under sunlight.

(D) The shadow behind the person.

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