Inclined Planes

1. The diagram represents a car resting on a hill. Which vector best represents the weight of the car?

   ![Diagram of car on hill]

   (1) A  (2) B  (3) C  (4) D

2. The accompanying diagram shows a 10.0-kilogram mass held at rest on a frictionless 30.0° incline by force $F$.

   ![Diagram of 10.0 kg mass on 30.0° incline]

   What is the approximate magnitude of force $F$?

   (1) 9.81 N  (2) 49.1 N  
   (3) 85.0 N  (4) 98.1 N

3. The accompanying diagram shows a block sliding down a plane inclined at angle $\theta$ with the horizontal.

   ![Diagram of block sliding down inclined plane]

   As angle $\theta$ is increased, the coefficient of kinetic friction between the bottom surface of the block and the surface of the incline will

   (1) decrease  
   (2) increase  
   (3) remain the same
4. Which graph best represents the motion of a block accelerating uniformly down an inclined plane?

(1) 

(2) 

(3) 

(4) 

5. Three forces act on a box on an inclined plane as shown in the diagram. [Vectors are not drawn to scale.]

If the box is at rest, the net force acting on it is equal to

(1) the weight
(2) the normal force
(3) friction
(4) zero

6. In the diagram below, a 10-kilogram block is at rest on a plane inclined at $15^\circ$ to the horizontal.

As the angle of the incline is increased to $30^\circ$, the mass of the block will

(1) decrease
(2) increase
(3) remain the same
7. In the diagram, the weight of a box on a plane inclined at 30° is represented by the vector \( W \). What is the magnitude of the component of the weight (\( W \)) that acts parallel to the incline?

(1) \( W \)
(2) 0.50 \( W \)
(3) 0.87 \( W \)
(4) 1.5 \( W \)

8. The diagram represents a 10-newton block sliding down a 30° incline at a constant speed. The force of friction on the block is approximately

(1) 5.0 N  (2) 10 N
(3) 49 N  (4) 98 N

9. A 1.0-kilogram block is placed on each of four frictionless planes inclined at different angles. On which inclined plane will the acceleration of the block be greatest?

(1) 
(2) 
(3) 
(4)
10. A book weighing 20 newtons slides at constant velocity down a ramp inclined 30° to the horizontal as shown in the diagram.

What is the force of friction between the book and the ramp?

(1) 10 N up the ramp
(2) 17 N up the ramp
(3) 10 N down the ramp
(4) 17 N down the ramp

11. Base your answer(s) to the following question(s) on the information and diagram below.

A 10.0-kilogram block slides at constant speed down a plane inclined at 20.° to the horizontal, as shown.

On the diagram, draw an arrow to represent and identify the direction of each of the three forces (weight, friction, normal force) acting on the block. Begin each arrow at point C and label each arrow with the force that it represents.

12. In one or more complete sentences, describe the change in the motion of the block as the angle of inclination is increased to 30.°.
1. Answer: 2
2. Answer: 2
3. Answer: 3
4. Answer: 4
5. Answer: 4
6. Answer: 3
7. Answer: 2
8. Answer: 1
9. Answer: 4
10. Answer: 1
11. Answer: 