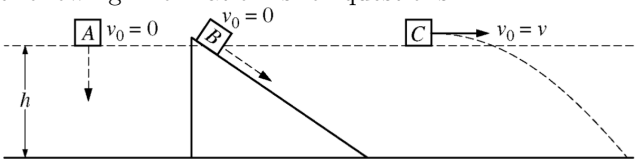
Physics
Horizontal Launch Projectiles,
Form: A

Name: _____
Date: _____
Period: _____
Primary Peer Reviewer: _____

| +1 | 0 | -1 | Σ |
|---|---|---|---|
| | | | |

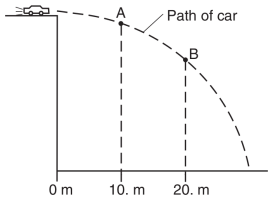
## Section 1. Multiple Choice

The following information is for questions 1-2:




Three identical blocks each take a different path from a height h to the ground. Block A is released from rest and falls vertically. Block B is released from rest and slides down a frictionless incline. Block C is projected horizontally with an initial speed v.

1. Which block takes the longest time to reach the ground?
   (a) Block A
   (b) Block B
   (c) Block C
   (d) All three blocks reach the ground at the same time.
2. Which block has the greatest speed just before it hits the ground?
   (a) Block A
   (b) Block B
   (c) Block C
   (d) All three blocks have the same speed just before they hit the ground.
3. The figure below shows the path of a stunt-car as it drives off a cliff. Compared to the horizontal component of the car's velocity at point A, the horizontal component of the car's velocity at point B is -




   (a) Greater
   (b) Smaller
   (c) The Same
   (d) it cannot be determined without knowing the car's initial velocity.
   (e) It cannot be determined without knowing the car's vertical velocity at either A or B.

## Section 2. Multiple Correct Multiple Choice

*For the following question,* ***choose two*** *correct answers. No credit will be given for incorrect or partially correct answers. Mark* ***both*** *answers clearly.*

4. When a projectile is launched horizontally, which of the following statements are true?
   (a) The vertical acceleration is equal to 9.81 $m/s^2$
   (b) The initial horizontal velocity is zero.
   (c) The initial vertical velocity is zero.
   (d) The horizontal final velocity is equal to the vertical acceleration.

## Section 3. Free Response

5. An accident investigator finds that a car has driven off the edge of Scenic Drive and off of a cliff. The investigator is given the task of determining whether the car was driving faster than the speed limit, which was 20 mph (8.9408 m/s) in that area. He may make any measurements that he needs.

   (a) In a clear, concise paragraph describe the process that the investigator should use to determine the initial speed of the car, and any measurements he should make.

   (b) The investigator measures that the cliff is 52 meters high, and the car landed 37 meters from the cliff. Complete the following table:

| | |
|---|---|
| $x =$ | $y=$ |
| $v_{ix} =$ | $v_{iy} =$ |
| $v_{fx} =$ | $v_{fy} =$ |
| $a_x =$ | $a_y =$ |
| $t =$ | |

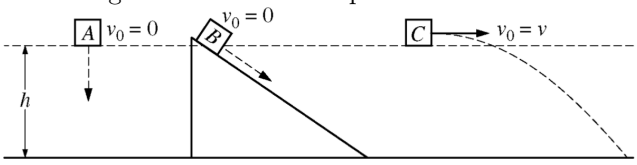
   (c) Determine the angle of impact of the car.

   (d) Was the car speeding?

# Answer Key for Exam A

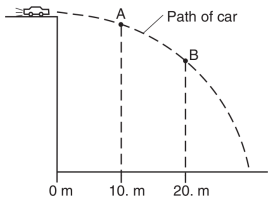
## Section 1. Multiple Choice

The following information is for questions 1-2:




Three identical blocks each take a different path from a height h to the ground. Block A is released from rest and falls vertically. Block B is released from rest and slides down a frictionless incline. Block C is projected horizontally with an initial speed v.

1. Which block takes the longest time to reach the ground?
   (a) Block A
   (b) Block B
   (c) Block C
   (d) All three blocks reach the ground at the same time.
2. Which block has the greatest speed just before it hits the ground?
   (a) Block A
   (b) Block B
   (c) Block C
   (d) All three blocks have the same speed just before they hit the ground.
3. The figure below shows the path of a stunt-car as it drives off a cliff. Compared to the horizontal component of the car's velocity at point A, the horizontal component of the car's velocity at point B is -




   (a) Greater
   (b) Smaller
   (c) The Same
   (d) it cannot be determined without knowing the car's initial velocity.
   (e) It cannot be determined without knowing the car's vertical velocity at either A or B.

## Section 2. Multiple Correct Multiple Choice

*For the following question,* ***choose two*** *correct answers. No credit will be given for incorrect or partially correct answers. Mark* ***both*** *answers clearly.*

4. When a projectile is launched horizontally, which of the following statements are true?
   (a) The vertical acceleration is equal to 9.81 $m/s^2$
   (b) The initial horizontal velocity is zero.
   (c) The initial vertical velocity is zero.
   (d) The horizontal final velocity is equal to the vertical acceleration.

## Section 3. Free Response

5. An accident investigator finds that a car has driven off the edge of Scenic Drive and off of a cliff. The investigator is given the task of determining whether the car was driving faster than the speed limit, which was 20 mph (8.9408 m/s) in that area. He may make any measurements that he needs.

   (a) In a clear, concise paragraph describe the process that the investigator should use to determine the initial speed of the car, and any measurements he should make.

   (b) The investigator measures that the cliff is 52 meters high, and the car landed 37 meters from the cliff. Complete the following table:

| | |
|---|---|
| $x =$ | $y=$ |
| $v_{ix} =$ | $v_{iy} =$ |
| $v_{fx} =$ | $v_{fy} =$ |
| $a_x =$ | $a_y =$ |
| $t =$ | |

   (c) Determine the angle of impact of the car.

   (d) Was the car speeding?