Name: DISC: Score: / 20

Instructions:

|  |  |  |  |
| --- | --- | --- | --- |
| Q1 | Q2 | Q3 | Q4 |
|  |  |  |  |
| 10 | 10 | 5 | 5 |

* Do your own work.
* Answer the questions below in the space provided.
* Make sure you show all your work and any equations that you use.
* Please place a box around your answers.
* Remember to give the correct units with all numerical answers

1. You throw a ball horizontally from off of a cliff. The ball has an initial velocity of and travels . Let the x-direction be horizontal and the y-direction be vertical.
   1. Draw a picture of the path you expect the ball to take to the ground. *Include the coordinate system*.

Picture:

* 1. Now let’s work on the motion of the ball.

Acceleration:

Direction:

:

* + 1. What is the acceleration of the ball?
    2. What is the direction of the acceleration?
    3. What is the x-component of the ball’s initial velocity (?
    4. What is the y-component of the ball’s initial velocity ?
  1. Now we want to find the distance . Select the equations you could use to calculate (select all correct equations).

Choice (2 pts):

* 1. Use your chosen equations to solve for (the height of the cliff).

Solution (3 pts):

1. A block of mass slides down a *frictionless* plane long. The angle between the ramp and the floor is .
   1. Select a coordinate system and complete the free-body diagram

Diagram (2pts):

* 1. Let’s consider the acceleration of the block:
     1. Does the acceleration depend on the mass, ?

Mass

Dependence:

:

:

* + 1. What is the x-component of the block’s acceleration, ?
    2. What is the y-component of the block’s acceleration, ?
  1. The block starts at rest at the top of the ramp (:
     1. Write down the equation you would use to find the speed at the bottom of the ramp:

Equation Selection (2 pts):

* + 1. Find the speed of the block at the bottom of the ramp.

Speed (3 pts):