

# PHYSICS 1<sup>ST</sup> SEMESTER PRACTICE FINAL

A student noticed that thicker strings on a guitar produce lower notes. She measured the thickness of the strings and the vibration frequency (pitch) of the string when plucked. She tightened each string to the same tension, then plucked each string while measuring its pitch with a computer.

1. What is the dependent variable ?

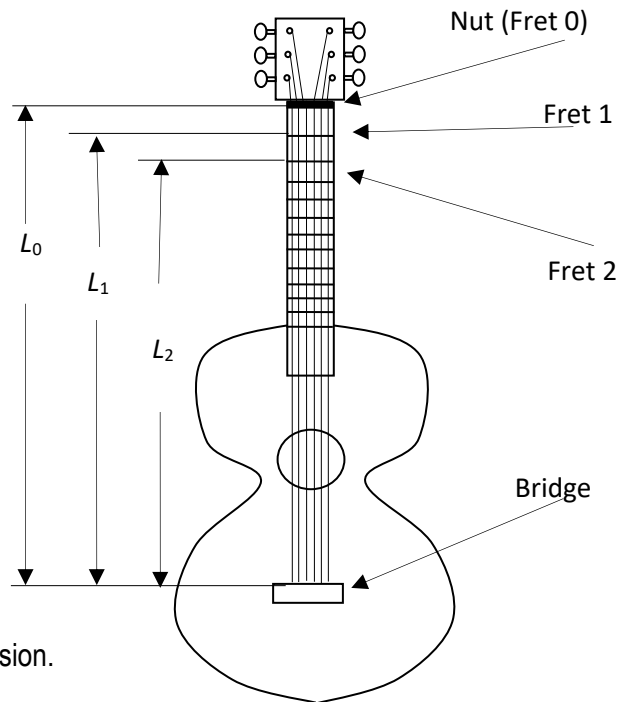
- the string tension
- the vibration frequency
- the length of the string
- the string thickness
- the pluck technique

2. What is the independent variable?

- the string tension
- the vibration frequency
- the length of the string
- the string thickness
- the pluck technique

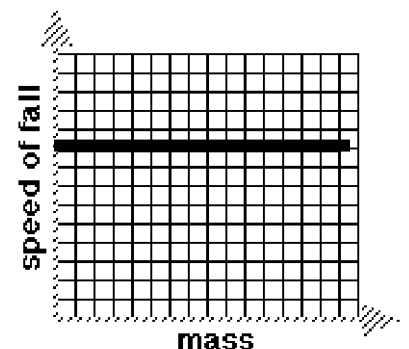
3. What is the relationship being studied?

- How the string thickness affects the string tension.
- How the vibration frequency affects the pitch.
- How the string thickness affects the vibration frequency.
- How the string tension affects the vibration frequency.

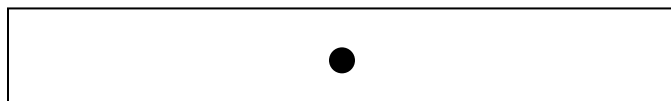


4. The graphical representation between speed and mass for the graph at the right could best be stated as:

- The speed of fall is directly proportional to the mass.
- The speed of fall is proportional to the square root of the mass.
- The speed of fall is inversely proportional to the mass.
- The speed of fall is proportional to the square of the mass.
- There is no relationship between the speed of fall and mass.



5. The motion diagram below represents



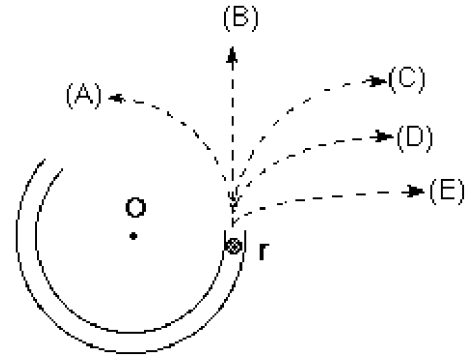
- an object at rest
- an object with constant, non-zero velocity
- an object with positive acceleration
- an object with negative acceleration

6. The motion diagram below represents (velocity is to the right).

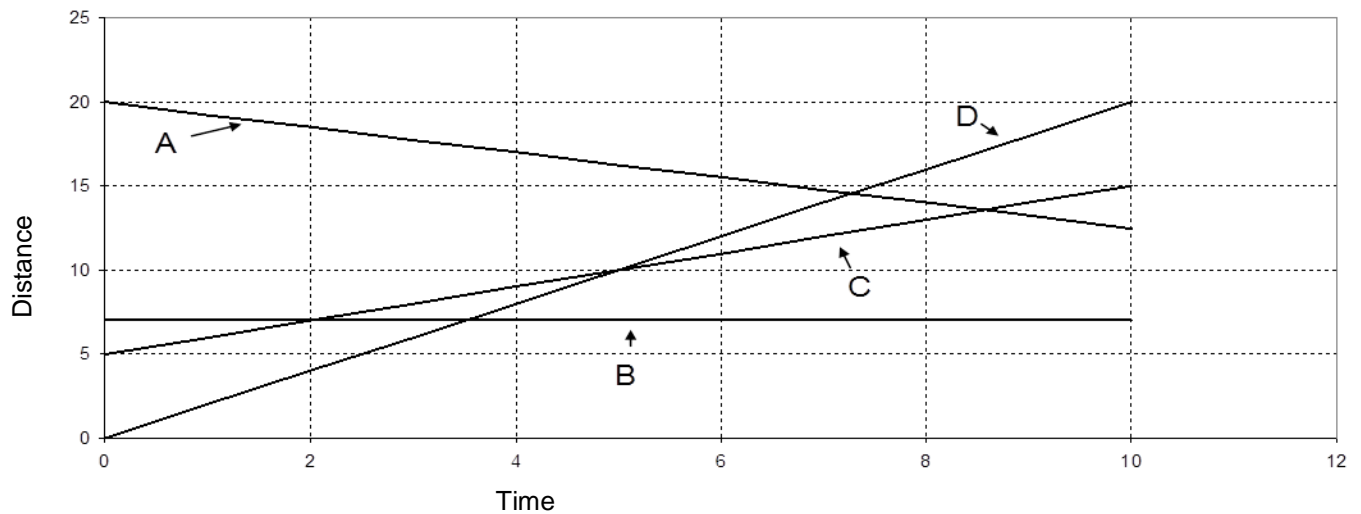


- an object at rest
- an object with constant, non-zero velocity
- an object with positive acceleration
- an object with negative acceleration

7. Which path in the figure at right would the ball most closely follow after it exits the channel at "r" and moves across the frictionless table top?



Use this time vs. distance graph for four different objects to answer questions below.



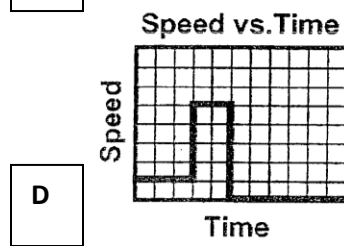
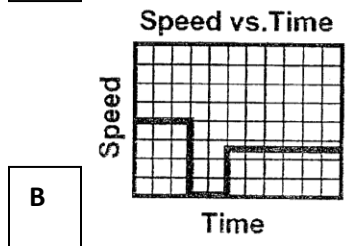
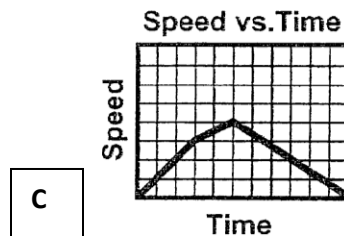
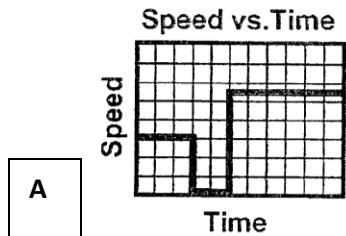
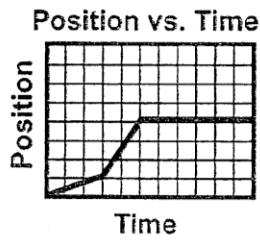
8. What is the difference in speed between Object C & D. (Hint: calculate slope)

- |            |            |
|------------|------------|
| a. 0.5 m/s | c. 1.5 m/s |
| b. 1 m/s   | d. 2 m/s   |

9. What object has a negative velocity?

- |      |      |
|------|------|
| a. A | c. C |
| b. B | d. D |

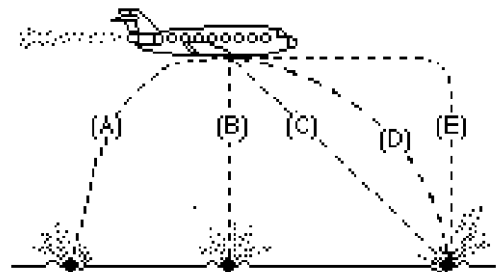
10. Match the position vs. time graph with the correct speed vs. time graph



11. A stone dropped from the roof of a single story building to the surface of the earth:
- reaches a maximum speed quite soon after release and then falls at a constant speed thereafter.
  - speeds up as it falls because the gravitational attraction gets considerably stronger as the stone gets closer to the earth.
  - speeds up because of an almost constant force of gravity acting upon it.
  - falls because of the natural tendency of all objects to rest on the surface of the earth.
  - falls because of the combined effects of the force of gravity pushing it downward and the force of the air pushing it downward.

A bowling ball accidentally falls out of the cargo bay of an airliner as it flies along in a horizontal direction.

12. As observed by a person standing on the ground and viewing the plane as in the figure at right, which path would the bowling ball most closely follow after leaving the airplane?

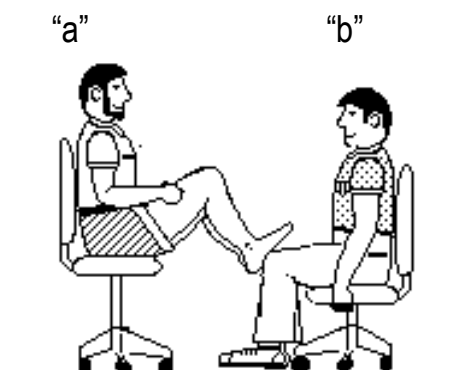


A woman exerts a constant horizontal force on a large box. As a result, the box moves across a horizontal floor at a constant speed " $v_0$ ".

13. If the woman doubles the constant horizontal force that she exerts on the box to push it on the same horizontal floor, the box then moves:
- with a constant speed that is double the speed " $v_0$ " in the previous question.
  - with a constant speed that is greater than the speed " $v_0$ " in the previous question, but not necessarily twice as great.
  - for a while with a speed that is constant and greater than the speed " $v_0$ " in the previous question, then with a speed that increases thereafter.
  - for a while with an increasing speed, then with a constant speed there after.
  - with a continuously increasing speed.

In the figure at right, student "a" has a mass of 95 kg and student "b" has a mass of 77 kg. They sit in identical office chairs facing each other.

Student "a" places his bare feet on the knees of student "b", as shown. Student "a" then suddenly pushes outward with his feet, causing both chairs to move.



14. During the push and while the students are still touching one another:
- neither student exerts a force on the other.
  - student "a" exerts a force on student "b", but "b" does not exert any force on "a".
  - each student exerts a force on the other, but "b" exerts the larger force.
  - each student exerts a force on the other, but "a" exerts the larger force.
  - each student exerts the same amount of force on the other.

Despite a very strong wind, a tennis player manages to hit a tennis ball with her racquet so that the ball passes over the net and lands in her opponent's court.

Consider the following forces:

- A downward force of gravity.
  - A force by the "hit".
  - A force exerted by the air.
15. Which of the above forces is (are) acting on the tennis ball after it has left contact with the racquet and before it touches the ground?
- 1 only.
  - 1 and 2.
  - 1 and 3.
  - 2 and 3.
  - 1, 2, and 3.

16. You are pulling a 2 kg cart with a force of 25 N across a rough floor with a constant velocity of 5 m/s. How much is the frictional force?  
a. 0 N    b. 5 N    c. 25N    d. 10 N
17. You have a mass of 50 kg, what is your weight on an elevator on Earth that is accelerating upward at  $2 \text{ m/s}^2$ ?  
a. 50 kg    b. 400 N    c. 500 N    d. 600 N
18. A ball is dropped and hits the ground 4.0 s later. Its final speed just before hitting the ground is  
a. 20 m/s    b. 40 m/s    c. 10 m/s    d. 5 m/s
19. If a car goes 50 m/s and then increases its velocity to 70 m/s in 0.25 s, what is its acceleration?  
a.  $80 \text{ m/s}^2$     b.  $120 \text{ m/s}^2$     c.  $0.20 \text{ m/s}^2$     d.  $70 \text{ m/s}^2$
20. A boat is heading east across a river at 12 km/hr. The current is 5 km/hr south. The magnitude of the resultant velocity of the boat is  
a. 8.5 km/hr    b. 13 km/hr    c. 17 km/hr    d. 7 km/hr
21. A projectile fired horizontally from a cliff, ignoring air resistance, has  
a. Constant vertical velocity and increasing horizontal velocity  
b. Increasing vertical velocity and increasing horizontal velocity  
c. Decreasing vertical velocity and decreasing horizontal velocity  
d. Increasing vertical velocity and constant horizontal velocity
22. The gravitational force between two objects is 500N. What would the new force be if change in one mass were doubled, and the distance between the masses doubled?  
a. 250 N  
b. 500 N  
c. 750 N  
d. 1000 N