

Physics 112
Practice – Midterm N20015

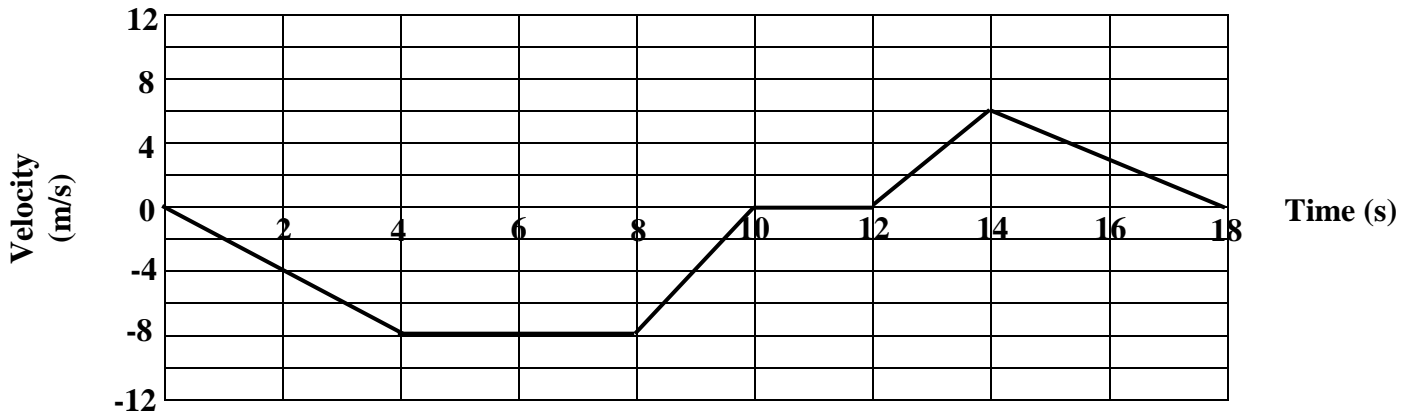
Name - _____

Date - _____

Solve the following problems on your own paper. Show full solutions.

1. A student on planet Luvfizics presses a 1.7 kg textbook against a vertical wall. The student applies a force of 35 N in order to prevent the textbook from sliding down the wall. If the coefficient of static friction is 0.274, what is the acceleration due to gravity on LuvFizics? Include an FBD for the textbook.
2. A rock is dropped from a bridge that crosses a river. If the rock is released 11.2 m above the water, how long does it take the rock to reach the water?
3. An applied force of 131 N is required to push 24 kg crate to the left across a factory floor with an acceleration of 0.52 m/s^2 left. What is the coefficient of kinetic friction between the crate and the floor? Include an FBD for the crate.
4. A 345 kg object accelerates uniformly from 12.6 m/s east to 5.23 m/s east. While accelerating, the car travels a distance of 182 m. What net force causes the car's acceleration?
5. Use the velocity-time graph to answer the questions below. Assume that the positive direction is east. Use east and west to describe the directions of vector quantities in your final answers. Show work when calculations are required. Express all answers to two significant digits.
 - a) What was the maximum velocity of the object?
 - b) What was the acceleration of the object at $t = 3 \text{ s}$?
 - c) What was the displacement of the object between 0 s and 18 s?
 - d) What was the average velocity of the object between 0 s and 18 s?
 - e) At what time, if any, did the object change its direction?
 - f) What was the average acceleration of the object between $t = 4 \text{ s}$ and $t = 14 \text{ s}$?
 - g) How long was the object stopped?

Velocity vs. Time Graph



6. A 0.27 kg soccer ball is rolling right at 6.0 m/s toward a player. The player kicks the ball in the opposite direction giving it a speed of 14 m/s.
- What impulse did the soccer player give to the ball?
 - The player applied an average force of -2.5×10^2 N to the ball to cause the change in velocity described above. How long, in ms, did the interaction between the ball and player last?