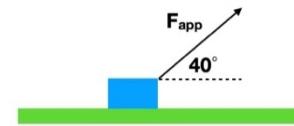




Polytechnic Tutoring Center

Midterm Review – PH 1213 Spring 2021

Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.

1. A car is travelling at a constant speed 45 mph. If the car starts accelerating with 3 m/s^2 constant acceleration, what will be the speed of the car 2 seconds later? Note that there are 1.61 km in a mile.
2. A boat is sailing in the southeast (45 degrees from south and east) direction at 50 m/s on water. If the water is moving toward north at 10 m/s. How fast is the boat travelling?
3. A ball was hit straight up into the air and fell to the same height 10 s later. What was the initial velocity of the ball?
4. An ice cube is sliding at 2 m/s on a frictionless tabletop 1 m above the ground before falling at the edge of the table. How far is its landing spot with respect to the edge of the table.
5. A block tied onto a spring is oscillating horizontally. If it takes 1.2 seconds for the block to travel from the left most position to the right most position, what is the frequency of the oscillation.
6. A 1.5 kg block was tied to a 1 m rope that was tied to a nail on a surface on the other end. If a block was given a push and circles around the nail at 10 m/s, what is the tension of in rope?
7. An equilateral triangle frame that has negligible mass has a mass tied onto each of its vertices. Each side length of the triangle frame is 1 m and the three masses are 2 kg, 5kg, and 7 kg. How far is the center of mass from the center of the triangle?
8. A 7 kg block is pulled across a table by a force $F_{\text{app}} = 65 \text{ N}$ that is directed at an angle of 40° above the horizontal as shown. If the coefficient of kinetic friction between the block and the table is 0.25, what is the magnitude of the acceleration of the block?A diagram showing a blue rectangular block on a green horizontal surface. A force vector F_{app} is shown originating from the bottom left corner of the block, pointing upwards and to the right at an angle of 40° relative to the horizontal surface.
9. If a 3 kg block pressed 0.5 m into a spring that has spring constant 1200 N/m and is on top of a 20 m hill. How much potential energy is it carrying?
10. An Atwood machine (a free to move pulley that hangs a mass on each side) has a 5 kg mass on one side and 2 kg mass on the other. How fast are the blocks accelerating?