

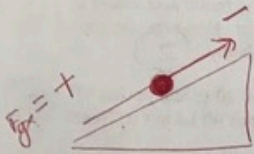
12/14/2018

T11 Key

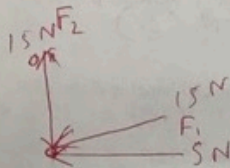
Rashidul B.

Inertia is the resistance of any physical object to any change in its velocity.

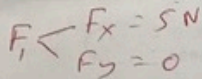
- 1. Which of the following situations describes inertia?
 - a. A stationary object tends to resist being moved.
 - b. A moving object tends to resist a change in speed.
 - c. A moving object tends to resist a change in direction.
 - d. all of the above
- 2. Which of the following is true of inertia?
 - a. It is described in Newton's first law of motion.
 - b. It is a property of motion.
 - c. It is measured by weight.
 - d. all of the above
- 3. Two forces act on an object. The magnitude of the net force acting on the object
 - a. equals the sum of the magnitudes of the two forces.
 - b. equals the difference in the magnitudes of the two forces.
 - c. equals the average of the two forces.
 - d. cannot be determined from the given information.



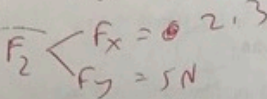
- 4. An object is at rest on an incline. The component of gravity acting downward and along the incline on the object is described as $F_{g,x} = +8.0 \text{ N}$. Which axis is pointing up the incline?
 - a. +x-axis
 - b. +y-axis
 - c. -x-axis
 - d. -y-axis



- 5. A force of 5 N and a force of 15 N acting on an object can produce the following net forces *except*
 - a. 20 N
 - b. 15 N
 - c. 10 N. $(15-5) < F < (15+5)$
 - d. 5 N. $(10 < F < 20)$



- 6. Two dogs are tugging on a toy. One dog pulls with a horizontal force of 14 N due north. The other is pulling due east with a horizontal force of 14 N. What is the direction of the net external horizontal force on the toy?
 - a. north
 - b. northeast
 - c. west
 - d. northwest



- 7. Which of the following statements describe an object in equilibrium?
 - I. The object is at rest.
 - II. The object is moving at constant velocity.
 - III. The net external force on the object is zero.
 - a. I and II
 - b. I and III
 - c. II and III
 - d. I, II, and III

$F_x = 5$
 $F_y = 5$

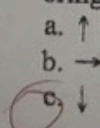
$\sqrt{25+25}$

$\sqrt{50}$

$= 7$

4

3

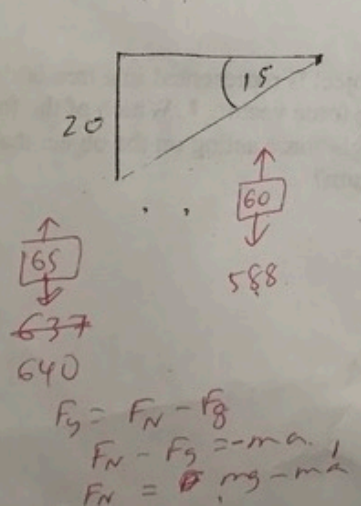


- 8. A single force acting on an object is represented in a free-body diagram of the object by the following force vector: \uparrow . Which of the following force vectors represents a single force acting on the object that will bring the object into equilibrium?
 - a. \uparrow
 - b. \rightarrow
 - c. \downarrow

9. A 20 KG crate initially at rest on a horizontal floor requires a 76 N horizontal force to set it in motion. Find the coefficient of static friction between crate and the floor. (a) 0.32 (b) 0.39 (c) None (2)
10. A student attaches a rope to a 10 kg box of books. He pulls with a force of 70 N at an angle of 30 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .500. Find the weight of the box (a) 10 kg (b) 10 N (c) 98 N (d) None (3)
11. A student attaches a rope to a 10 kg box of books. He pulls with a force of 70 N at an angle of 30 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .500. Find Normal Force. (a) 151 N (b) 63 N (c) 98 N (d) 196 N (e) None (2)
12. A student attaches a rope to a 10 kg box of books. He pulls with a force of 70 N at an angle of 30 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .500. Find the force of Kinetic friction. (a) 75.5 N (b) 15 N (c) 31.5 N (d) 196 N (e) None (3)
13. A student attaches a rope to a 20 kg box of books. He pulls with a force of 90 N at an angle of 30 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .500. Find the acceleration (a) .12 m/s/s (b) 3.85 m/s/s (c) 2.9 m/s/s (d) None (2)
14. A crate is pulled to the right (positive x axis) with a force of 82 N, to the left with a force of 115 N, upward with 565 N and downward with 236 N. Find the net force (a) 300 N (b) 310 N (c) 320 N (d) 330 N (e) None (4)
15. A crate is pulled to the right (positive x axis) with a force of 82 N, to the left with a force of 115 N, upward with 565 N and downward with 236 N. Find the direction of the Net Force. (a) 92° clockwise from positive x-axis (b) 96° counter clockwise from positive x-axis (c) 90° clockwise from positive x-axis (d) 90° counter clockwise from positive x-axis (2)
16. A tractor of mass m is connected to a trailer by a rope. The rope can carry 7,000 N before it breaks. The trailer accelerates at 2 m/s^2 . As it drags across the ground, a frictional force of 1,000 N acts in the direction opposite its motion. However, the rope breaks. Using the rope's breaking strength of 7,000 N. Find mass. a. 2000 kg (b) 3000 kg (c) 4000 kg (d) None (2)
17. A standing jump would raise Mr. Bari 0.40 m off the ground. To do this, Mr. Bari (62 kg) crouches 0.20 m and pushes off from the ground, exerting a force on it. Find his speed just as he leaves the ground? (a) 4 m/s (b) 2.8 m/s (c) 3.8 m/s (d) 1.8 m/s (e) None (2)
18. A standing jump would raise Mr. Bari 0.40 m off the ground. To do this, Mr. Bari (62 kg) crouches 0.20 m and pushes off from the ground, exerting a force on it. What force must he exert on the ground to perform a 0.40 m jump? (a) 40 N (b) 3050 N (c) 1823 N (d) 4032 N (e) None (3)
19. A ball, q , hangs down at an angle, due to the motion of the car. As car accelerates, driver notice the ball hanging down with an angle of $q = 9^\circ$. How fast were driver accelerating? (a) 1.6 m/s/s (b) 1.2 m/s/s (c) None (1)
20. What net force is needed to bring a 1000 kg car to rest from a speed of 100 km/hour within a distance of 55 m? (a) 10650 N (b) -10650 N (c) 7100 N (d) -7100 N (e) None (4)
21. A 150 gram ball at the end of string is revolving uniformly in a horizontal circle of radius .600 m. The ball makes 2 revolution in a second. Find the centripetal acceleration. (a) 91 m/s/s (b) 93 m/s/s (c) 95 m/s/s (d) 97 m/s/s (e) none (3)
22. A 60 kg woman descends in an elevator that briefly accelerates at $0.20g$ downward when leaving a floor. She stands on a scale that reads in kg. During this acceleration, what is her weight? (a) 588 N (b) 637 N (c) 400 N (d) None (1)
23. A 65 kg woman descends in an elevator that briefly accelerates at $0.20g$ downward when leaving a floor. She stands on a scale that reads in kg. During this acceleration what does the scale read? (a) 500 N (b) 510 N (c) 637 N (d) 764 N (e) None (2)
24. A 150 gram ball at the end of string is revolving uniformly in a horizontal circle of radius .600 m. The ball makes 2 revolution in a second. What is the acceleration of the ball? (a) 90 m/s/s (b) 95 m/s/s (c) 100 m/s/s (d) None (2)
25. What is a Period? (a) Number of cycles per second (b) Amount of time it takes to complete a cycle. (2)

Extra Credit (5 points)

A state trooper is hiding 20 feet from a straight highway with a speed limit of 65 mph. One second after a truck passes, the angle θ between the highway and the line of observation from the patrol car to the truck is measured. If $\theta = 15^\circ$ does the truck driver get a speeding ticket (1 mile = 5,280 ft)?



TOA
 $\tan 15 = \frac{20}{A}$
 $A = \frac{20}{\tan 15} = \frac{20}{.27} = 74 \text{ ft/s}$
 $74 \frac{\text{ft}}{\text{s}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{3600 \text{ s}}{1 \text{ hr}} = 50 \text{ MPH}$

No, he didn't break the law b/c
 50 MPH < 65 MPH

$m(8 - a)$
 $60(9.8 - a)$
 $196 - 60a$
 $65(9.8 - a)$