

Name: _____ Date: _____ Period: _____
Physics 1 :: Chapter 5:: Post-Test OPEN BOOK & OPEN NOTES. This exam is NOT open PEOPLE.

Multiple Choice and Matching: Write the letter of the best answer or match on the blank at the left.

- _____ 1. Three forces are added. 10-N at 0° , 20-N at 180° , and 10-N at 90° . Which answer is the resultant? (A) 14.14-N (B) 14.14-N @ 45° (C) 14.14-N @ 135° (D) -14.14-N @ 135°
- _____ 2. For the same three forces as in problem 1, what is the equilibrant? (A) 14.14-N (B) 14.14-N @ 45° (C) 14.14-N @ 135° (D) -14.14-N @ 135°
- _____ 3. When using the mathematical method of vector addition, the law of cosines is used to find (A) the direction. (B) The magnitude. (C) the sum. (D) the angle C.
- _____ 4. The equation to find the coefficient of friction for an object sliding down an incline with a constant velocity is (A) $\mu = \sin \theta$ (B) $\mu = \cos \theta$ (C) $\mu = \tan^{-1} \theta$ (D) $\mu = \tan \theta$
- _____ 5. TRUE OR FALSE: The component method of vector addition only works in the x and y coordinate plane. (A) TRUE. (B) FALSE.
- _____ 6. TRUE OR FALSE: The component method of vector addition only works with forces. (A) TRUE. (B) FALSE.
- _____ 7. The x-component of a vector is -5-N, and the y-component is -3-N. In which quadrant does the vector fall? (A) I. (B) II. (C) III. (D) IV.
- _____ 8. On _____ ground, the normal force is equal in magnitude to the gravitational force. (A) Sloped ground. (B) Smooth ground. (C) Flat ground. (D) Wet ground.
- _____ 9. A box sliding down an incline is best solved using:
(A) X and Y frame of reference
(B) Parallel and Perpendicular frame of reference
(C) Law of Sines and Cosines frame of reference
(D) Graphical method of vector addition
- _____ 10. Which variable does not have an impact of friction? (A) The weight. (B) The material itself. (C) Surface area. (D) Whether it is moving or at rest.
- _____ 11. When hanging a picture with a wire over a nail, the wire will hold more weight when it is, (A) longer so it hangs closer to vertical. (B) shorter so it hangs closer to horizontal. (C) It does not matter which way the wire is attached.
- _____ 12. Your answer to number 11 is correct because, (A) The forces do not combine. (B) the wire is aligned to the direction of the force, maximizing its effectiveness. (C) the wire and force are perpendicular, maximizing the force on the wire.

Short Answer: Write a response to the following question.

1. Jack knows that the static friction coefficient is 0.57. For a 100-N crate, Jack is told the static friction is actually 37-N. Jack says that is impossible, it must be 57-N. Explain your understanding Jack's response.

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Problems: Show all work. (Draw diagrams as needed)

1. A hiker spends a weekend following the path described below. Determine the hikers total displacement by either mathematical method of vector addition.

(A) 10-km N. (B) 15-km E. (C) 8-km at 30° N of E. (D) 22-km at 140° . (E) 10-km at 15° E of N.
2. A rink manager glides a hockey net across the frictionless ice. With a force of 50-N at 30° below the horizontal. What is the acceleration of the net?
3. The same net must be moved after the game when the ice is chopped up by the skates. The same motion (as in problem 2) requires the rink hand to apply a force of 150-N horizontally. What is the force of friction on the ice? What is the coefficient of friction of the chopped ice?
4. A block sits on a rough table top with a coefficient of friction equal to 0.4. If the block has a mass of 2.0-kg, and is pulled by a hanging block with a mass of 2.0-kg, what is the net force on the block on the table and what is its acceleration?
5. John is applying a force of 500-N to the handle of his lawn mower that makes an angle of 50° with the horizontal. What force is moving his mower across the ground? What could he do to make mowing easier in terms of the force which he must apply?
6. A skier is on a slope of 35° wearing skis that have a coefficient of friction of 0.07. If the skier is 65-kg with all of her gear, what force is applied by the tow rope lift to move the skier up the slope with a velocity of 2-m/s?
7. Two mules pull a barge down a canal with a constant velocity. If the mules are on opposite sides of the canal, and their chains make an angle of 70° , and the down shore mules pulls with a force of 2000-N, what force does the upshore mule apply if the total pulling force is 3200-N?