

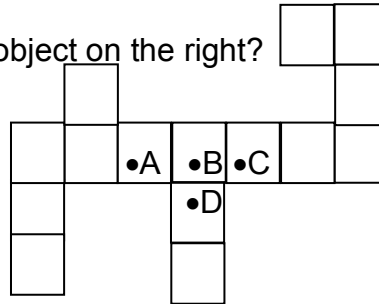
Integrated Math & Physics
Final Exam: Matching & Multiple Choice

Name _____

Multiple Choice Section

1. Where is the center of mass of the object on the right?

- (a) At point A
- (b) At point B
- (c) At point C
- (d) At point D



2. The easiest way to calculate how fast you'll be going after you go down the icy hill on your sled is to use:

- (a) the kinematics equations
- (b) free body diagrams
- (c) conservation of momentum
- (d) conservation of energy

3. What is the mass of a block traveling at 2.2 m/s that has 18 J of kinetic energy?

- (a) 3.7 kg
- (b) 7.4 kg
- (c) 8.2 kg
- (d) 16.4 kg

4. In which of these situations is no work done?

- (a) Ms. Crowe pushes her cart with all your papers on it across the floor.
- (b) Gravity acts as a book falls to the floor.
- (c) Mr. Lautman lifts a lacrosse stick over his head.
- (d) Mr. Sanders pushes against the wall.

5. Potential energy is:

- (a) always can be converted into kinetic energy.
- (b) always can be converted into Newtons.
- (b) always greater than zero.
- (d) always calculated with respect to the floor.

6. One second after a football is at the top of its path, what is true about its velocity?

- (a) Its vertical velocity is 10 m/s.
- (b) Its vertical velocity is -10 m/s.
- (c) Its horizontal velocity is 10 m/s.
- (d) Its horizontal velocity is -10 m/s.
- (e) Its velocity is 10 m/s.
- (f) Its velocity is -10 m/s.

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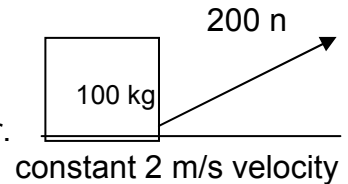
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7. A meteor in outer space has no forces at all acting on it. Which of the following best describes how it could be moving?

- (a) The meteor could only be at rest.
- (b) The meteor could only be moving at a constant velocity.
- (c) The meteor could be at rest or could be moving at a constant velocity.
- (e) none of the above

8. In the picture on the right, which of the following forces would be the largest?

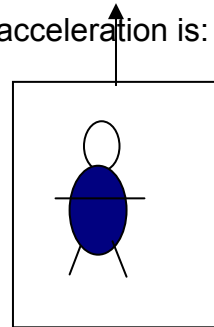
- (a) F_f (b) F_g (c) F_n (d) F_p
- (e) F_n and F_g are the largest and equal to each other.



9. The coefficient of friction between the floor and the table legs is 0.42. You push horizontally on your 20.0-kilogram table. The table travels across the floor at a constant speed. How much force are you pushing with?

10. Look at the goofy man jumping in the elevator. His acceleration is:

- (a) -19.3 m/s^2 (b) -10 m/s^2
- (c) -9.3 m/s^2 (d) -0.7 m/s^2
- (e) 0 m/s^2 (f) 0.7 m/s^2
- (g) 9.3 m/s^2 (h) 19.3 m/s^2



Elevator is accelerating up at 9.3 m/s^2

11. The weight of a three-year-old child would most likely be around:

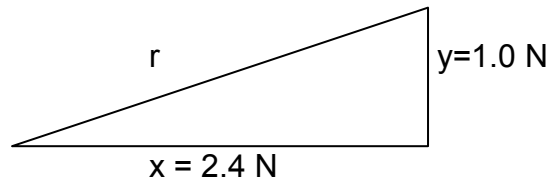
- (a) 1 N (a) 10 N (b) 100 N (d) 1,000 N (e) 10,000 N

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12. What is the length of side r on the triangle?

- (a) 2.6N (b) 4.2 N (c) 5.9 N (d) 9.4 N

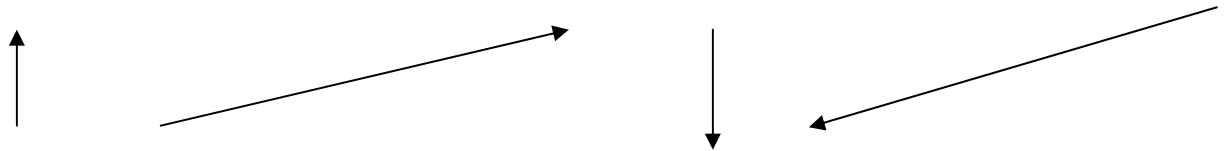


13. Here is vector **A**:

and here is vector **B**:



Which of the following is **C**, where $\mathbf{C} = \mathbf{A} + \mathbf{B}$?



14. Draw a free body diagram for a woman standing on a ramp at rest?

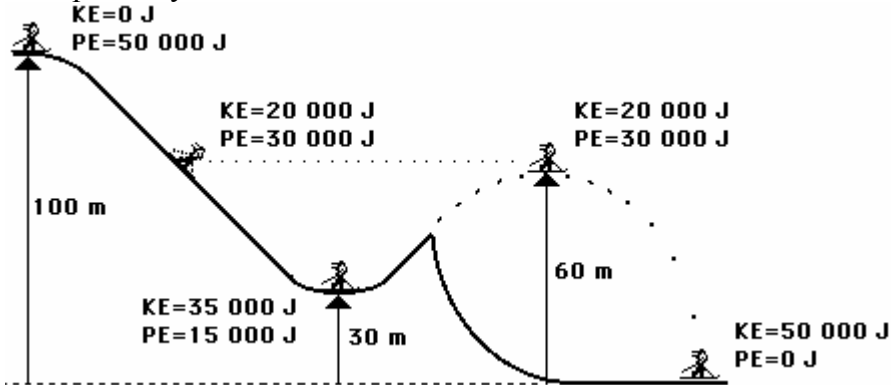
15. A ball is dropped from the top of a tall building. After 2 seconds:

- (A) The velocity is + and the acceleration is +
- (B) The velocity is + and the acceleration is -
- (C) The velocity is - and the acceleration is +
- (D) The velocity is - and the acceleration is -
- (E) None of these

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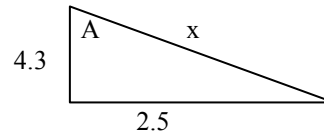
16. Below is a picture you've seen before.



What is the mass of the skier?

- (A) 150 kg
 - (B) 100kg
 - (C) 50kg
 - (D) 25kg
 - (E) None of these
17. Find the missing side (x) and the missing angle (A).

- (A) 8.7, 60°
- (B) 5.0, 60°
- (C) 5.8, 60°
- (D) 5.0, 30°
- (E) 5.8, 30°



18. Which of the following best describes the concept of inertia.

- (A) For every action there is an equal and opposite reaction
- (B) Every force causes an acceleration based on the mass of the object
- (C) An object's velocity will remain unchanged, unless a force acts on it.
- (D) Energy can neither be created nor destroyed
- (E) Momentum before and after a collision must be equal.

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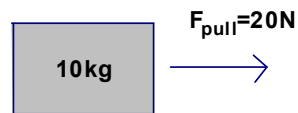
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19. When using energy equations, we often make statements like “The Potential Energy at the top must equal the Kinetic Energy at the bottom.” Which of the following statements justifies this procedure?

- (A) Energy can neither be created nor destroyed
- (B) Momentum before = Momentum after
- (C) An object in motion tends to stay in motion, unless acted on by a force
- (D) Both (A) and (B)
- (E) None of these

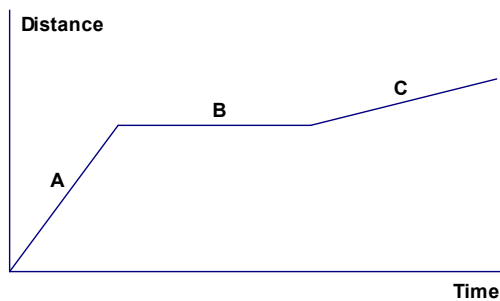
20. Given the diagram below, what is the value of the coefficient of friction, μ .

- (A) 0.10
- (B) 0.20
- (C) 0.30
- (D) 0.40
- (E) 0.50



21. The graph below represents the distance travelled by some object. When is the velocity of the object greatest?

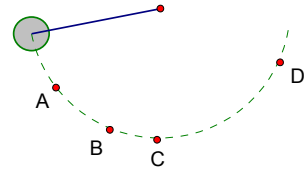
- (A) A
- (B) B
- (C) C
- (D) Can't be determined using this information.
- (E) Velocity is same during A,B, and C.



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For questions 22 and 23 use the diagram of a pendulum below.



22. At which point would the pendulum bob have the largest Potential Energy?

- (A) A
- (B) B
- (C) C
- (D) D
- (E) The Potential Energy would be the same at all of these points.

23. At which point would the pendulum bob have the largest momentum?

- (A) A
- (B) B
- (C) C
- (D) D
- (E) The momentum would be the same at all of these points.

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Below are two columns – the left containing terms and the right containing definitions. Match them by placing the letter of the definition in the blank of the appropriate term.

- | | |
|-------------------------|---|
| _____ Acceleration | a. acts opposite the direction of motion |
| _____ Velocity | b. how fast an object is travelling |
| _____ Displacement | c. is conserved in collisions |
| _____ Force | d. a number that relates Weight and F_f |
| _____ Momentum | e. weight |
| _____ Speed | f. a constant on the earth |
| _____ Force of Friction | g. the difference between initial and final position |
| _____ Force of Gravity | h. any push or a pull that accelerates and object |
| _____ g | i. is equal to zero when forces are balanced. |
| _____ $\mu\mu$ | j. a magnitude and a direction |
| _____ Net Force | k. rate at which the velocity is changing |
| _____ Vector | l. increases as an objects height increases |
| _____ Potential Energy | m. speed + direction |