College physics a strategic approach solutions manual

I'm not robot!

College physics a strategic approach solutions manual

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College Physics: A Strategic Approach was written by and is associated to the ISBN: 9780321879721. // parallel any symbol average (indicated by a bar over a symbol—e.g., v̄ is average velocity) °C Celsius degree °F Fahrenheit degree Showing 1-20 Start your review of Student Solutions Manual for College Physics: A Strategic Approach Volume 1, Chapters 1-16 for College Physics: A Strategic Approach with MasteringPhysics(TM) Mickey rated it liked it May 24, 2016 Prince K. marked it as to-read Jun 30, 2018 Felicia marked it as to-read Oct 01, 2020 Randall D. Knight Brian Jones, Colorado State University Stuart Field, Colorado State University ©2015 | Pearson Format On-line Supplement ISBN-13: 9780321902979 Availability Share the publicationSave the publication to a stackLike to get better recommendationsThe publisher does not have the license to enable download OR 1-1 R EPRESENTING M OTION 1 Q1.1. Reason: (a) The basic idea of the particle model is that we will treat an object as if all its mass is concentrated into a single point. The size and shape of the object will not be considered. This is a reasonable approximation of reality if: (i) the distance traveled by the object is large in comparison to the size of the object, and (ii) rotations and internal motions are not significant features of the object's motion. The particle model is important in that it allows us to simplify a problem. Complete reality — which would have to include the motion of every single atom in the object — is too complicated to analyze. By treating an object as a particle, we can focus on the most important aspects of its motion while neglecting minor and unobservable details. (b) The particle model is valid for understanding the motion of a satellite or a car traveling a large distance. (c) The particle model is not valid for understanding how a car engine operates, how a person walks, how a bird flies, or how water flows through a pipe. Assess: Models are representations of reality — not reality itself. As such they almost all make some simplifying assumptions. The test of a good model is the results it produces. The particle model allows us to model the motion of many objects simply and see common features of the movement of different objects. When used appropriately it is very useful. When used outside the range of its validity, it isn't very helpful. Q1.2. Reason: The softball player starts with an initial velocity but as he slides he moves slower and slower until coming to rest at the base. The distance he travels in successive times will become smaller and smaller until he comes to a stop. See the figure below. Assess: Compare to Figure 1.10 in the text. Q1.3. Reason: Assess: The dots are equally spaced until the brakes are applied to the car. Equidistant dots indicate constant average speed. On braking, the dots get closer as the average speed decreases. Q1.4. Reason: As the ball drops from the tall building the ball will go faster and faster the farther it falls under the pull of gravity. The motion diagram should show the displacements for later times to be getting larger and larger. The successive displacements in the diagram given in the text get smaller and smaller. So the diagram given in the problem is incorrect. The correct diagram is on page 1-2. 1-2 Chapter 1 Assess: Compare to Figure 1.5 in the text, which shows a motion diagram for two objects falling under the influence of gravity. The displacements increase during the fall of the object as we reasoned. Q1.5. Reason: Position refers to the location of an object at a given time relative to a coordinate system. Displacement, on the other hand, is the difference between the object's final position at time t_f and the initial position at time t_i. Displacement is a vector, whose direction is from the initial position toward the final position. An airplane at rest relative to a runway lamp, serving as the origin of our coordinate system, will have a position, called the initial position. The location of the airplane as it takes off may be labeled as the final position. The difference between the two positions, final minus initial, is displacement. Assess: Some physics texts are not as explicit or clear about this terminology, but it pays off to have clear definitions for terms and to use them consistently. Q1.6. Reason: The distance you travel will be recorded on the odometer. As you travel, the distance you travel accumulates, is recorded by the odometer, and is independent of the direction of travel. Your displacement is the difference between your final position and your initial position. If you travel around a 440 m track and end up where you started, you have traveled 440 m; however, since you ended up where you started, your change in position and hence displacement is zero. Assess: If you watch a track meet, you will observe the 440-m race. As you watch the race, it is obvious that the runners travel a distance of 440 m (assuming they complete the race). Yet since they end up where they started, their final position is the same as their initial position and hence their displacement is zero. Q1.7. Reason: Both speed and velocity are ratios with a time interval in the denominator, but speed is a scalar because it is the ratio of the scalar distance over the time interval while velocity is a vector because it is the ratio of the vector displacement over the time interval. Speed and velocity have the same SI units, but one must specify the direction when giving a velocity. An example of speed would be that your hair grows (the end of a strand of hair moves relative to your scalp) at a speed of about 0.75 in/month. An example of velocity (where direction matters) would be when you spring off a diving board. Your velocity could initially be 2.0 m/s up, while later it could be 2.0 m/s down. Assess: Saying that a velocity has both magnitude and direction does not mean that velocity is somehow "better" and that speeds are never useful. Sometimes the direction is unimportant and the concept of speed is useful. In other cases, the direction is important to the physics, and velocity should be cited. Each shows up in various physics equations. Q1.8. Reason: Since the velocity of the skateboard is negative during the whole time of its motion, it is moving in the negative direction the entire 5 seconds. In order to move closer to the origin, which is in the positive direction relative to the starting point of the skateboard, the skateboard must have had a velocity in the positive direction for some time. Since the velocity is always negative, the skateboard must be farther from the origin than initially. Assess: Velocity gives direction of motion since it refers to displacements and not only distance traveled. If velocity is always negative, displacement will be negative also. Q1.9. Reason: Yes, the velocity of an object can be positive during a time interval in which its position is always negative, such as when (in a usual coordinate system with positive to the right) an object is left of the origin, Representing Motion 1-3 but moving to the right. For example, $x_i = -6.0$ m and $x_f = -2.0$ m. (The magnitude of Δt here is unimportant as long as time goes forward.) However, the velocity (a vector) is defined to be the displacement (a vector) divided by the time interval (a scalar), and so the velocity must have the same sign as the displacement (as long as Δt is positive, which it is when time goes forward). So the answer to the second question is no. Assess: We see again the importance of defining terms carefully and using them consistently. Students often use physics language incorrectly and then protest, "but you knew what I meant." However, incorrect word usage generally exposes incomplete or incorrect understanding. Also note that unless stated otherwise, we assume that our coordinate system has positive to the right and that time goes forward (so that Δt is always positive). Q1.10. Reason: Since the jogger is running around a track, she returns to her starting point at the end of the lap. Since her final position is the same as her initial position, her displacement is 0 m. Velocity is defined as displacement in a given time intervalvelocitytime interval = So her average velocity is 0 m/s! However, though her displacement is 0 m, the actual distance she traveled is 400 m. Her average speed is not zero, since speed is defined in terms of distance, not displacement. distance traveled in a given time intervalspeedtime interval = Her average speed is then 400m100s 4m/s. = The second friend is correct. Since the motion of a runner is not uniform we can only calculate average velocity and average speed. Assess: This problem illustrates a very important difference between speed and velocity. Speed depends on total distance traveled. Velocity depends on displacement, which only takes into account the starting and ending points of a motion. Q1.11. Reason: Assess: The dots get farther apart and the velocity arrows get longer as she speeds up. Q1.12. Reason: The child will be traveling with a constant velocity until hitting the rocky patch. During the constant velocity part of the motion the motion diagram should show equal displacements during each time interval. After hitting the rocky patch, the sled will start slowing. After this point the motion diagram should show ever-decreasing displacements and ever-decreasing velocity vectors. The motion diagram is below. Assess: Compare to Figure 1.11 in the text where a similar motion is illustrated. Q1.13. Reason: The initial velocity is zero. The velocity increases and the space between position markers increases until the chute is deployed. Once the chute is deployed, the velocity decreases and the spacing between the position markers decreases until a constant velocity is obtained. Once a constant velocity is obtained, the position markers are evenly spaced. See the following figure.