Free download Chapter 12 motion problems (Download Only)

motion problems are based on the formula d rt where d distance r rate and t time how to solve motion or distance word problems step 1 draw a diagram to represent the relationship between the distances involved in the problem step 2 set up a chart based on the formula rate time distance the concepts of displacement distance velocity speed acceleration are thoroughly discussed problems questions and examples are presented with solutions and detailed explanations graphical analysis of motion problems are also included these problems allow any student of physics to test their understanding of the use of the four kinematic equations to solve problems involving the one dimensional motion of objects you are encouraged to read each problem and practice the use of the strategy in the solution of the problem this collection of problem sets and problems target student ability to use kinematics graphs and kinematic equations to solve problems for displacement velocity acceleration and time for a variety of 1 dimensional motion scenarios here the best equation that relates the known and unknown information is x frac 12 at 2 v 0t x 21at2 v0t or v 2 v 0 2 2ax v2 v02 2ax we choose the first so begin align x frac 12 at 2 v 0t frac 12 2 2 2 10 2 16

quad rm m end align x 21at2 v0t 21 2 2 2 10 2 16 m here are some examples for solving motion problems example 1 how long will it take a bus traveling 72 km hr to go 36 kms first circle what you re trying to find how long will it take time motion problems are solved by using the equation therefore simply plug in 72 km hr is the rate or speed of the bus and 36 km is the distance problem solving strategy applying newton s laws of motion identify the physical principles involved by listing the givens and the quantities to be calculated sketch the situation using arrows to represent all forces determine the system of interest the result is a free body diagram that is essential to solving the problem the two types of problems are problem type 1 a projectile is launched with an initial horizontal velocity from an elevated position and follows a parabolic path to the ground predictable unknowns include the initial speed of the projectile the initial height of the projectile the time of flight and the horizontal distance of the projectile the two balls are 12 0m apart when they start their motion find the maximum speed at which the first ball can be thrown such that it doesn t collide with the second ball before it returns to its starting height practice projectile motion problem solving it is necessary to understand how to break a vector into its x and y components in order to solve problems for projectiles break the initial velocity vector into its components apply the kinematics equations lecture notes motion problems page 2 practice problems 1 we traveled for nine hours then we increased our velocity by 7 miles per hour and traveled an additional

six hours what was our original velocity if all together we have traveled 582 miles 2 a bicycle leaves chicago heading east at 12 mi h two hours later a second bicycle leaves once again we will use the uniform motion formula solved for the variable t example 8 83 hamilton rode his bike downhill 12 miles on the river trail from his house to the ocean and then rode uphill to return home his uphill speed was 8 miles per hour slower than his downhill speed problem 1 alexey received the following problem a particle moves in a straight line with velocity v t t 2 8 meters per second where t is time in seconds at t 2 the particle s distance from the starting point was 5 meters what is the total distance the particle has traveled between t 2 and t 6 seconds problems with detailed solutions problem 1 an object is launched at a velocity of 20 m s in a direction making an angle of 25 upward with the horizontal a what is the maximum height reached by the object b what is the total flight time between launch and touching the ground of the object yes no part 2 of motion problems goes through a more complex example problem of how gravity affects the motion of a thrown object uniform motion problems with streams and winds another type of uniform motion problem is where a boat is traveling in a river with the current or against the current or an airplane flying with the wind or against the wind if a boat is traveling downstream the current will push it or increase the rate by the speed of the current motion related problems motion with constant velocity the distance traveled is the product of velocity and time s vt s v t were s distance v velocity t

time it follows that t s v t s v and v s t v s t motion in a current of water or air let x velocity of the boat airplane in still water air and p m x v mass x velocity units for momentum kg m s south kg times meters per second south with direction final velocity vf vi acceleration x time final velocity equals initial velocity plus acceleration x time study with quizlet and memorize flashcards containing terms like speed distance time and more section learning objectives by the end of this section you will be able to do the following describe the properties of projectile motion apply kinematic equations and vectors to solve problems involving projectile motion section key terms properties of projectile motion projectile motion problems and answers problem 1 a person kicks a ball with an initial velocity of 15 m s at an angle of 37 above the horizontal neglecting the air resistance find a the total time the ball is in the air b the horizontal distance traveled by the ball

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