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Page 100 1 An object has moved remotely. Can you have zero shift? If yes, it supports the solution with an example. Solution yes, it is very possible. An object can have zero shift even when it moved through a distance. This happens when the final position of the object coincides with its initial position. Examples: (a) A person moves around the park and is on the spot where he started then the move will be zero but the distance traveled will not be zero (b) if you go around a circle and return to the starting point , then the movement will be zero but the distance will not be the question 2 a farmer moves along the border of a square field side 10 m in 40 s. Which will be the size of moving the farmer at the end of 2 minutes 20 seconds from its initial position? Solution Leave ABCD is the square field and Farmer begins to point A and moves in the counterclockwise direction given in the problem side of the square field = 10m therefore, perimeter = 10 m x 4 = 40 m Farmer moves along the border in 40s. So the speed of the farmer = traveled distance / time taken = 40/40 = 1m / s disposition after 2 m 20 s = 2 x 60 s + 20 s = 140 s =? Traveled distance to 140s = speed ore = 1 Ã- 140 m = 140 m hour, number of revolutions to cover 140 along the border = total distance / perimeter = 140 m / 40 m = 3.5 round so, after 3.5 Rotondo farmer will be at point C of the field. So Displacement = magnitude of AC = diagonal of the square of the side 10 m = 10 (2) 1/2 = 14.14m 3 Which of these is true for moving? (a) You can't be zero. b) His magnitude is greater than the distance traveled by the object. Solution None of the statement is true for moving as (1) the movement can be zero. In the figure above, a person moves from point to and traveled along the square to reach A A. Its shift is zero (2) the movement is less than or equal to the distance traveled by the object. In the figure above, a person moves from point A to B and then C, now the movement is long AC while the distance is AB + BC. So the displacement magnitude is never superior to the distance traveled by the object Page 102 Question 4 distinguishes between speed and speed. Velocity of the solution The speed is the distance traveled by an object in a given time interval. The speed is moving an object into a given time interval. Velocity = distance / time Velocia = Shift / time Speed is scaled Quantity ie it only has magnitude. The speed is the vector quantity, ie it has both the size and direction. Question 5 In what condition (i) is the magnitude of the average speed of an object equal to its average speed? Solution The average speed of an object is equal to its average speed, only when an object moves in a straight line. Question 6 What is the odometer of a car measurement? Solution La Covered by a car. Question 7 What does the path path Does the object look like when it is moving uniformly? Solution path straight line. Question 8 During an experiment, a signal from a spacecraft reached the ground station in five minutes. How far was the spacecraft from the ground station? The signal travels at the speed of light, i.e. 3 to 108 m sã¯1. Solution Data Speed= 3 108 m s. 1 Time= 5 min = 5 x 60 = 300 sec. We know that Distance= Velocity x Time Distance= 3 to 108 m sâ§1 x 300 sec. = 9 x 1010 m Page 103 Question 9 When will you say a body is in (i) uniform acceleration? (ii) non-uniform acceleration? Solution Uniform acceleration Non-uniform acceleration A body is said to be in uniform acceleration if it travels in a straight line and its speed increases or decreases by equal amounts at equal intervals of time. A body is said to be in non-uniform acceleration if the rate of change of its velocity is not constant. Question 10 A bus decreases its speed from 80 km ha1 to 60 km ha1 in 5 s. Find the acceleration of the bus. Solution We need to be very careful with the units while asking the numerical questions. Here we will convert km/h to m/s Initial velocity (u) = 80 km/h= (80 Ã 1000) /3600 m/s = 22.22 m/s Final velocity (u) = 60 km/h= (60 Ã 1000) /3600 m/s = 16.66 m/s Now the acceleration is given from = Speed change Time taken = (v-u) /t =-1.112 m/s2 Here negative sign denotes de-acceleration Question 11 A train that starts from a railway station and moves with uniform acceleration reaches a speed of 40 km hã1 in 10 minutes. Find its acceleration. Solution Date Initial train speed (u) =0 Final train speed (v) =40 km/h = 11.11 m/s Time taken (t) = 10 min= 600s Time The acceleration is given by = Change in speed / time taken = (v-u) /t = .0185 m/s2 Page 107 Question 12 Is the nature of distance – 'time graphs for uniform and non-uniform motion of an object? Solution When the motion is uniform, the distance time graph is a straight line with a slope. When the motion is not uniform, the distance time graph is not a straight line. It can be any curve. 13 What can be said about the motion of an object whose distance – the graph of time is a straight line parallel to the axis of time? Solution is at rest Question 14 What can be said about the motion of an object if its velocity – 'the time graph is a straight line parallel to the time axis? Solution It means that the velocity is constant and the object moves evenly Question 15 What is the amount that is measured by the area occupied under the velocity – time graph? Solution The area underneath the velocity-time graph gives the distance covered by the object. Question No 3 by Mr Van der A bus from the rest moves with a uniform acceleration of 0.1 m /s2 for 2 minutes. Find (a) the speed acquired (b) the distance travelled. Solution Date Initial speed of the = 0 Acceleration(a) = 0.1 m/s2 Time taken(t) = 2 minutes = 120 s (a)According to the first equation of the movement $v= u+ at$v=0 + 0.1 \times 120$ v= 12 m/s (b)According to the thirdmotion: $ v^ 2 – u ^ 2 = 2AS $ where, S is the distance covered by the bus $ (12) ^ 2 – (0) ^ 2 = 2 \ times (0.1) \ times s $ s = 720 M Question 17 A train is traveling at a speed of 90 km hÃ¢'1. The brakes are applied in such a way as to produce a uniform acceleration of the Ã¯5 m sÃ¢¯2. Find out how far the train will be before it is taken to rest. Solution Initial train speed (U) = 90 km / h = 25 m / s Final train speed (V) = 0 (How finally the train rests) Acceleration = – 0.5 m / s2 according to Motion's third equation: $ v^ 2 = u^ 2 + 2AS $ (0) ^ 2 = (25) ^ 2 + 2 times \ (-0.5) \ times S $ where, S is the distance covered by train $ s = \ frac {625} {2 (0.5) } = $625m The train will cover a distance of 625m before resting. Question 18 A trolley, while descending an inclined plane, has an acceleration of 2 cm sÃ¢'2. What will be its speed 3 s after the start? Indicated solution Initial speed of the cart (U) = Acceleration from 0 cm / s (A) = 2 cm / S2 Time, T = 3 S We know that the final speed is given by IST Equation of Motion $ V = U + to $ $ V = 0 + 2 \ times 3 $ Therefore, the speed of the train after 3 seconds = 6 cm / s Question 19 A racing machine has a uniform acceleration of 4 m / s2. How far will it cover in 10 s after the start? Solution Initial machine speed (U) = 0 m / s Acceleration (A) = 4 m / s2 Time (t) = 10 s Sac the distance is given by the second equation of motion $ s = ut + \ frac {1} {2} to ^ 2 $ Therefore, Distance covered by cars in 10 seconds $ s = 0 \ times 10 + \ frac { 1} {2} \ times 4 \ times (10) ^ 2 $ = 200 m Question 20 A Stone is thrown in a vertically upward direction with a velocity of 5 m/s. If the acceleration of the stone during its movement is 10 m / s2 in the downward direction, what will be the height reached by the stone and how long will it take to reach there? Solution given the initial velocity of the stone (U) = 5 m / s Acceleration (A) = -10 m / s2 (since the acceleration is opposite to the direction of motion) Final velocity of the stone (V) = 0 m / s We know how from 3rd equation of uniform motion $ 2AS = V^2-U^2$ $ 2 (-10) s = 0- (5) ^ 2 $ s = 25/20 = 12.5 m We know from ist Equation of uniform motion v = U + A 0 = 5-10T T = .5S Question 21 An athlete completes a round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes 20 s? Solution Donato Diameter of the circular track (D) = 200 m Circular track radius (R) = 200/2 = 100 m Time taken by the athlete for a round (t) = 40 s Thus distance covered by the athlete in a round (s) = 2¯ â^¬ r = 2 x (22/7) x 100 = 4400/7 m Speed of the athlete (s) = distance / hour = (4400) / (7 x 40) = 110/7 m / s hour covered distance in 140 s = speed Ã time = (110/7) x (140) = 2200 m Number of rounds in 40 S = 1 Round number of rounds in 140 s = 140/40 = 3 Ã, ã, Ã,Ã½ to focus on circular terrain after having Started by position A, the athlete will be in position B after 3/20 turn, then, movement of the athlete, compared to the initial position a b = ab = diameter of the circular track = 200 200 Question 22 Joseph Jogs from one end to the other end B of a straight road of 300 m in 2 minutes 30 seconds and then turns and approaches 100 m back to point C in another 1 minute. What are the average speeds and the average speeds of Joseph in jogging? (a) from A to B (b) from A to C? Total distance solution covered by AB = 300 m Total time socket = 2 x 60 + 30 s = 150 SA) Average speed from ab = total distance / total time = 300/150 m / s = 2 m / s average speed from ab = Displacement ab / time = 300/150 m s-1 = 2 m s-1 b) total distance covered by ac = ab + bc = 300 + 100 m total time taken from a to c = time socket for ab + time socket for AB + TIME BC = 150s + 60 s = 210 s average speed from AC = total distance / total time = 400/210 m / s = 1.904 m / s Now shift (s) from A to C = AB - BC = 300- 100 m = 200 m time (t) taken for moving from AC = 210 s average speed from AC = displacement / I / time (t) = 200/210 m / s = 0.952 m / s Question 23 Abdul, while driving a School, calculates the average speed for your journey to be 20 km HÃ ¢ '1. On his journey along the same path, there is less traffic and average speed is 30 km hÃ ¢ '1. What is the average speed of Abdul's trip? Solution Let the ABDUL distance of the pendulasse while driving from home to school = D Allow the time taken from Abdul to Switch this distance = T1 Now distance Abdul switches while driving from school at home = D We try to take the time Employee from Abdul to Switch this distance = T2 average speed from home to school v1 = 20 km / h average speed from school at home v2 = 30 km / h now we know the time taken from home to school t1 = d / v1 = d / 20 In the same way school to home T2 = D / V2 = D / 30 Total distance from home to school and forth = 2D Total time taken from home to school and backwards (t) = D / 20 + D / 30 Average speed (VAV) To cover the total distance (2s) = total distance / total time = 2D / (D / 20 + D / 60) = 2D / [(2D + D) / 60] = 120D / 5D = 24 km / H Question 24 A motorboat that starts from rest on a lake accelerates in a straight line at a constant speed of 3.0 m / s2 for 8.0 s. How far away is the boat during this time? Solution Dated initial speed of motor boat (U) = 0 acceleration of motor boat, Ã, a = 3.0 m s-2 examination time, Ã ¢ t = 8.0 s We know that the distance traveled as a 3rd law of the Uniform movement $ s = ut + frac {1} {2} a ^ $ 2 the travel distance to motorboat $ s = 0 times 8 + frac {1} {2}} Times 3.0 times (8) ^ 2 $ $ = frac {1} {2} times 3.0 times (8) ^ 2 $ = 96 m Question 25 A car driver traveling at 52 km hÃ ¢ '1 Apply brakes and accelerates Uniform in the opposite direction. The car stops in 5 s. Another driver who is going to 3 km hÃ ¢ '1 in another car applies his brakes slowly and stop in 10 s. On the same paper graph, trace the speed against the time for the two cars. Which of the two cars traveled furthest after the brakes were applied? SOLUTION PRIMO DRIVER DRIVER AutoÃ¢ Initial speed (UA) = 52 km / h = 52 x 1000/3600 = Final speed of 14.4 m / S S Tempo impiegato (tA) = 5s Second conductor Initial speed (uB) = 3 km/h = 3 x 1000/3600 = 0.83 m/s Ã Time used (tB) = 10s Drawing the velocity-time graph, the PR and SQ graph represent the velocity-time graph for two cars with velocity 14.4 m/s and .83 m/s respectively. Distance travelled with first car before resting =Area of 3 OPR = (1/2) x OR x OP = (1/2) x 5 s x 14.4 m/s = 36.11 m Distance travelled with second car before resting =Area of 3 OSQ = (1/2) x OQ x OS = (1/2) x 10 s x 83 m/s = 4.16 m Question 26 shows the distance-time graph of three objects A, B and C. Study the graph and solve the following questions: (a) Which of the three is traveling faster? (b) Are all three ever at the same point on the road? (e) How long has C path when B passes A? (d) How long has B path when C passes? Solution Important points to note The velocity is given by = Distance / time = Y axis/X axis = Slope So the object with the steepest slope will have the velocity Higher (a) Object B is Since the slope of Object B is greater than objects A and C, it travels faster. (b) No, because all three lines never intersect at the same point c) When B and A meet at a point, object C is at a point about 8 km on the axis of the distance. d) B meets C is at the point . The position on the distance axis is 9 units from the origin O. One unit is on the distance axis = 4/7 (7 units = 4 km). So Object B is = 9 x 4/7 = 5.14 km. Question 27 A ball is gently dropped from a height of 20 m. If its velocity increases evenly at the velocity of 10 m sÂ¤2, how fast will it hit the ground? After what hour will it hit the ground? Solution Initial velocity of the sphere (u) =0 Distance or height of the fall (s) =20 m Downward acceleration,Ä¨ a =10 m /s2 As we know from the third equation of uniform motion 2as =v2-u2 v2 = 2as+ u2 = 400 So Final velocity of the sphere, v = 20 m/s As sapp let's take the first equation of uniform motion $v=u+ at $t = \frac {v-u}{a}$ Time taken by the ball to strike = (20-0) /10 = 20/10 = 2 seconds Question 28 The speed and time graph of a car is shown under (a) Find out how far the ball moves Car in the first four seconds. Shadows the area on the chart that represents the distance the car traveled during the period. (b) Which part of the graph represents the uniform motion of the car? Solution (a) The shaded area in orange equal to 1 / 2 x 4 x 6 = 12 m represents the distance the car traveled in the first 4 seconds. (b) The blue portion of the graph between 6 s and 10 s represents the uniform motion of the car. Question 29 Indicate which of the following situations are possible and give an example for each: a) an object with constant acceleration but zero velocity. b) an object It moves in a given direction with an acceleration in the perpendicular direction. Solution (a) possible when a ball is launched at maximum height, it has zero zero even if it will have a constant acceleration due to gravity, which is equal to 9,8 m/s2 (b) Possible When a car moves on a circular track, its acceleration is perpendicular to its direction. 30 An artificial satellite is moving in a circular orbit of the radius of 42250 km. Calculate its speed if it takes 24 hours to rotate around the earth. Radius solution of circular orbit, r= 42250 km Time used to rotate around the earth, t= 24 h Speed of a moving circular object, v= (2π r)/t = 3073.74 m /s Download NCERT solutions for class 9 8 science chapter as pdf link to this page by copying the following textERT (text and exercise) Motion solutions for class 9 physics Read also Class 9 math Class 9 Class 9 Class 9 Class 9 Class 9

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