Physics class 9 motion numericals worksheet

The formula Used Question 1 The train accelerates from 36 km/h to 54 km/h in 10 sk. (i) Acceleration (ii) Distance travelled by car. Answer a. Acceleration gives \(a = \frac{{\Delta to}}{{\Delta t}}\) $\Delta v = 54 -36 = 18 km/hr =\frac {18 \times 1000}{3600} m/s= 5 m/s$ So a=,5 m/s2 b. Distance gives \(S = ut + \frac{1}{2}a{t^2}\) Now u=36 km/hr =10m/s $s=10 \times 10 + \frac {1}{2} They are 125m Question 2 A body whose speed is constant (a) Must be accelerated (b) Might be accelerated (c) Has a constant velocity (d) Cannot be accelerated. The answer can be accelerated Question 3 A truck travelling at 54 km/h slows down to 36 km/h in 10 sh. Find the answer for backwardness Here u=54 km/h =15 m/s ,v=36 km/h=10 m/s Acceleration gives \(a = \frac{{\Delta to}}}{{\Delta t}}\) $a\) So a=-.{10} 5 m/s2 Negative sign tings retardation Question 4 Garlicster is controlled by a circle of 20 m in diameter. What is its distance and as in the table below S.no Circles The distance to move 1 1 2 1.5 3 2 4 2.5 Answer After each round, the particles get to this initial position. So displacement on full circles will be zero S.no Circles Distance shift 1 1 0 \(20\pi \) 2 1.5 20 m \(30\pi \) 3 2 0 \(40\pi \) 4 2.5 20m \(50\pi \) 5. Find the acceleration of the scooter. The response acceleration is given by \(a = \frac{{\Delta in}}}{{\Delta t}}\) $ a = \frac {20 -10}{4} = \frac {10}{4}=2,5$ So a=2.5 m/s2 Question 6 The train starts from rest and accelerates steadily at a speed of 5 m/s2 to 5 sec. Calculate the train speed in 5 sk. Answer Here u=0 ,a= 5m/s2 ,t= 5 sk,v=? Now $v=u+at$ $v= 0 + 5 \times 5 =25$ m/s Question 7 Subject moves with a single positive acceleration. Its speed and time graph will (a) A straight line parallel to the time axis (b) A straight line tilted at the obtuse angle on the time axis (c) A straight line tilted at an acute angle to the time axis (d) None of these. Answer answer is (c) Question 8 Maximum train speed is 90 km/h. It takes 10 hours to cover a distance of 500 km. Find the ratio of average speed to top speed? Answer $ \text {Average speed}= \frac {\text {total distance}}{time} =\frac {500}{10}=50$ km/hr Average speed ratio= 50:90=5:9 Question 9 The car starts from rest and gains a speed of 54 km/h in 2 sk. Find (i) acceleration (ii) the distance travelled by cars, assume that the car's move is uniform? Answer u=0, v=54 km/h=15 m/s ,t=2 sk a) Acceleration gives \(a = \frac{{\Delta to}}{{\Delta t}}}})$a = \frac {15-0}{2}$ So a=7,5 m/s2 b) Distance gives \(S = ut + \frac{1}{2}a{t^2}\) $s= 0 \times 2 + \frac{1}{2} \times 7.5 \times 4$ s=15m Question 10 Facility pao sa ostetine falls from 10 m/s2. Find speed 5 s after it's dropped. Answer $v=u+at$ \(u = 0\) \(v = 10 \times 5 = 50m/s\) Question 11 The ball is thrown up and goes height of 100 m and comes down 1) What is the net shift? 2) What is the net distance? Answer As it comes to the starting point net shift is zero Net distance=200 m Question 12 Two cars A and B race each other. Car A ran for 2 minutes at 7.5km/h, slept for 56 minutes and ran again for 2 minutes at 7.5 km/h. Answer We know that $Distance = speed \times time$ Distance travelled in the first 2 minutes = $\frac {7.5 \times 2}{60}$= 0.25 km Distance traveled in the last 2 minutes = $\frac {7.5 \times 2}{60} {60}$= 0.25 km Total distance = .25+.25 = 0.5 km Total time = 2+2+56 = 60 minutes = 1 hr Average speed = 0.5/1 = 0.5 km/hr Question 13 Anand leaves his home at 8.30 A.M for his scorpo. The school is 1.2 miles away and classes start at 9:00 a.m. .M. If the first kilometre goes at 3 km/h, what speed should the second mile walk to reach just in time? Answer $speed =\frac {distance}{time}$ or $time= \frac {distance}{speed}$ To travel 1 km with 3 km/hr, Time taken = 1/3 hr = 20 min Now he has to reach school in 30 min,So he has cover another 1 km and = 30 -20 =10 min= 1/6 hr So speed should = distance /time= 1/(1/6) = 6 km/hr Question 14 An object moves along a straight line with an acceleration of 2 m/s2. If his initial speed is 10 m/s, what will his speed be 2 s later? Answer 10 m/s,t=2 s, a=2 m/s2 $v=u+at$ $v= 10 + 2 \times 2 =14$ m/s Question 15 The ball hits the sandbox at a speed of 20 m/s and penetrates up to a distance of 6 cm. Find the deceleration of the bullet in the sandbox. Answer 3333,3 m/s2 Question 16 Particles continuously accelerate for 20 seconds after starting rest. If it travels the distance D1 in the first 10 seconds and the distance D2 in the next 10 seconds, then (a) D2 = D1 (b) D2 = 2D1 (c) D2 = 3D1 (d) D2 = 4D1 Answer (c) Question 17 Speed -time graph SUV is given below. The mass of the SUV is 1,000 kg. A. What is the distance the SUV travels on in the first 2 seconds? B. What is the braking force at the end of 5 seconds for the SUV to stop in one second? Answer a. The distance travelled by the SUV is the first 2 seconds = Zone $\Delta ABE$$$= \frac {1}{2} \times AE \times BE$$=\frac {1}{2} \times 2 \times 15= 15m$ b. Acceleration will give inclination of the CD line $a= \frac {0 -15}{6-5} = -15 m/s^2$ Now the mass of the SUV =1000 Kg of braking force $F=ma = 1000 \times -. 15 =-15000 N$ 18. ii. How many distances would an electron cover during that time.? Answer $u= 5 \times 10^3 m/s$, $a=10^3 m/s^2$, $v=2u=10^4$ m/s i.Using $v=u+at$ 10^4 = 5 \times 10^3 + 10^3 t$ or t=5 sec ii. Using $s=ut+ \frac {1}{2}at^2$ $s = 5 \times 10^3 5 + \frac {1}{2} \times 10^3 \times 5^2$ $=37.5 \times 10^3 m$ Question 19 The 100 m long train is moving at 72 km/hr. Find the time it takes to cross a 2-mile-long bridge? Answer According to Lenght of Train = 100m , speed = 72 km/hr = 20 m/s, Lenght of the Bridge =2 Km. 2000 + 100 = 2100 m So yes, it takes 2100 m so it takes 1000 m time = \frac {distance}{velocity} = \frac {2100}{20} =105 sec$ Question 20 A artificial satellite is moving in a circular orbits of radius 42,250 km (approx). Calculate its linear speed if it takes 24 hours to rotate around the earth.? Answer Given r =42,250 km , T = 24 hour Linear speed in circular motion given with $v = \frac {2 \pi r}{T} = \frac {e 2 \times 3.14 \times 42,250}{24} = 11.05 km/hr$ 21. Find (i) its acceleration (ii) its speed (iii) the distance covered by the cyclist in 15 seconds Answer (i) From the graph we can see that the speed does not change So,acceleration is zero. (ii) By reading the graph speed = 20 m/s (iii) Distance covered in 15 seconds, $s = u \times t = 20 \times 15 = 300$ m Question 22 The object starting from rest travels 20 m in the first 2 s and 160 m in the next 4 s.What will be the speed after 7 s from the beginning. Answer Here u=0, s=20 m ,t=2 sec \(S = ut + \frac{1}{2}a{t^2}\) $20= 0 + \frac {1}{2} a \times 4$ $a Now Velocity at the end of 2 sec $v=u+at$ $v=10 \times 2=20$ m/s Now Checking the motion for the next 4 sec, Let's assume it's a_1 how we're not sure about moving in the second part of Tu u=20 m/s ,s=160 m ,t=4 sec \(S = ut + \frac{1}{2}a {t^2}\) $160 = 20 \times 4 + \frac {1}{2} a_1 \times $16 $$a_1 = 10 m/s^2$ So acceleration is a constant u both movements. Now we can quickly calculate the speed as u=0, t= 7sec , a=10m/s2 $v=u+at$ $v= 0 + 10 \times = 70 m/s$ Question 23 Object travels 20 m to 2 s and then another 16 m in 2 s. What is the average speed of an object? Answer Total distance, traveled by object =20 m + 16 m = 36 m Total duration = 4 s + 2 s = 6 s $\text {Average speed} = \frac {\text {total Distance travelled d}}}{\text {total time taken }}$ $\text {Average Speed} = \frac {36}{6} = 6$ m/s Question 24 Distancemoved and the magnitude of displacement are equal in ? (a) The Earth rotates around the Sun (b) An object moving in a circular path (c) pendulum is moving and fro (d) The object moves only along the straight road Answer (d). Distance and displacement in all other cases Question 25 Stopping the distance of vehicles : When the brakes are applied to the moving vehicle, the distance travelled before stopping is called stopping the distance. It is an important factor for road safety and depends on the initial speed (v_0) and braking performance, or deceleration, which is caused by braking. The car, which travels at 72km/h, suddenly brakes with a deceleration of 5m/s2. Find stopping distance Odgovor Tukaj u=72 km/hr = $\frac {72 \times 1000}{3600} m/s= 20$ m/s , v=0 a= -5 m/s2 Zdaj z uporabo povezave $v^2 = u^2 + 2as$ $0 = (1 20)^2 + 2 \times (-5) \times s$ $s= 40 m$ Download Numerical Motion Problems and Solution worksheet as pdf link to this page by copying following textNumerical Questions and answers on Motion for Class 9 physics Also Read Class 9 Maths Class 9 Science Science