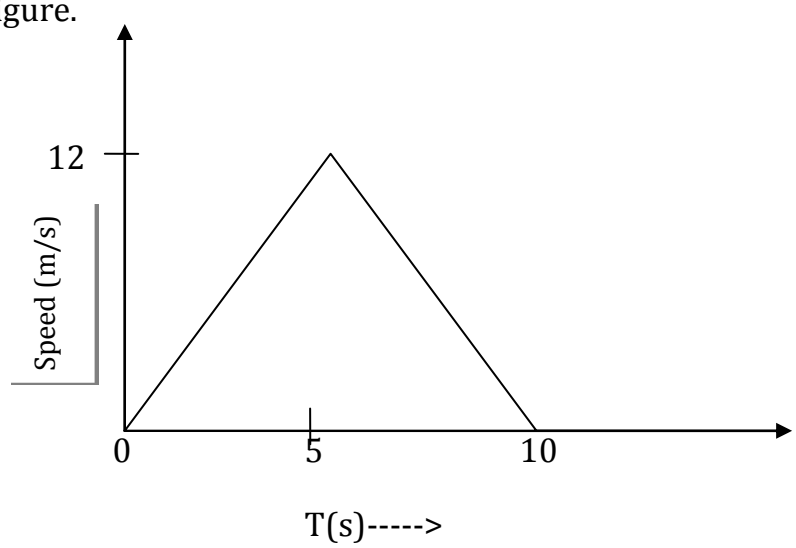
SUNCITY SCHOOL
sadaiva agrani

ONE DIMENSIONAL MOTION

1. An athlete covers one rounds of circular track of radius 2m in 4s. What will be the distance and displacement at the end of 2min 20 s?
2. A parachutist bails out from an aero plane and after dripping through a distance of 40 m opens the parachute and decelerates at 2m/s, how long is he in the air? At what height did he bail out from the aero plane?
3. A bullet looses 1/20 of its total velocity in passing through a plank. What is the least number of planks required to stop the bullet?
4. Two bodies are released from the same height at an interval of 1 s. How long after the first body begin to fall, will the two bodies be 10 m apart? [$g=10m/s^2$]
5. A 100m sprinter increases her speed from rest uniformly at a rate of 1.5 m/s^2 up to three quarter of the total run and covers last quarter with uniform speed. How much time does she takes to covers the first half and second half of the run?
6. A ball is dropped from a bridge 122.5 m above the river. After the ball has been falling for 2s, a second ball is thrown straight down after it. What must be its initial velocity so that both hit the water at the same time?
7. A body covers 12 m in 2^{nd} second and 20 m in 4^{th} second. Find what distance the body will cover in 4 seconds after 5^{th} second?
8. What is the displacement of a point of a wheel of radius R initially in contract with the ground when the wheel rolls forward half a revolution? Assume x- axis to be forwarded direction.
9. A body traveling along a straight line traversed one third of the total distance with a velocity of 4m/s. The remaining part of the distance was covered with a velocity 2m/s for half the time and with velocity of 6m/s for the other half of the time. What is the mean velocity averaged over the whole time of the motion?
10. A jet airplane traveling at a speed of 500km/h ejects its products of combustion at the speed of 1500 km/h relative to the jet plane. What is the speed of the latter with respect to an observer on the ground?
11. Two trains A and B of lengths 400 m each are moving on two parallel tracks with a uniforms speed of 72 km/h in the same direction with A ahead of B. the driver of B decides to overtake A and accelerates by 1 m/s^2.If after 50 s. the guard of B just brushes past the driver of A, what was the original distance between them?

12. The speed time graph of a particle moving along a fixed direction is as shown in the figure.



13. The distance traversed by a moving particle at any instant is half of the product of its velocity and the time of traverse. Show that the acceleration of the particle is constant.
14. The displacement x of a particle moving in one direction under the action of a constant force is related to time t by the equation: $t = \sqrt{x} + 3$, where x is in meters and t in seconds. Find the velocity and acceleration of the particle at the end of two seconds.
15. A stone is dropped from the top of a cliff and is found to travel 44.1 m in the last second before it reaches the ground. Find the height of the cliff?