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CLASS: IX: Physics (Motion)

- Two trains start at the same instant from two stations A and B respectively with initial velocities u_1 and u_2 . Both the trains move with uniform velocity, meet each other and then reach stations B and A after time t_1 and t_2 respectively. Show that $u_1:u_2 = \sqrt{t_2}:\sqrt{t_1}$
- A swimmer can swim in still water at a rate of 4 km/h. If he swims in a river flowing at 3 km/h and keeps his direction (w.r.t. water) perpendicular to the current, find his velocity with respect to ground.
- A particle moving in a straight line with uniform acceleration moves through distance of 80 m and 100 m in two successive seconds. Find the velocity at the beginning of the first second and the acceleration. Find also the distance moved in the next second.
- A man walks at a speed of 6 km/h for 1 km and 8 km/h for the next 1 km. W is his average speed for the walk of 2 km?
- A hammer weighing 5 kg descending from a height of 0.5 m struck a nail and stops in $\frac{1}{10}$ th second. Find the force.
- A particle having initial velocity u moves with a constant acceleration a for a time t . (a) Find the displacement of the particle in the last 1 second. (b) Evaluate it for $u = 5$ m/s, $a = 2$ m/s² and $t = 10$ sec.
- A batsman deflects a ball by an angle of 45° without changing its initial speed which is equal to 54 km/h. What is the impulse imparted to the ball? Mass of the ball is 0.15 kg.
- A table clock has its minute hand 4 cm long. Find the average velocity of the tip of the minute hand (a) between 6 am to 6:30 am, (b) between 6 am to 6:30 pm.
- A ball A is dropped from a height 44.1 m high cliff. Two seconds later, another ball B is thrown downwards from the same place with some initial speed. The two balls reach the ground together. Find the speed with which the ball B was thrown.
- The distance travelled by a particle in time t is given by $s = (2.5 \text{ m/s}^2) t^2$. Find, (a) the average speed of the particle during the time 0 to 5 sec, and (b) the instantaneous speed at $t = 5$ sec.