SUNCITY SCHOOL
sadaiva agrani

PROJECTILE AND CIRCULAR MOTION

1. A ball thrown by one player reaches the other one in 2 seconds. What is the maximum height attained by the ball above the point of projection?
2. A body is projected with a velocity of 40 m/s. After 2 s, it crosses a vertical pole of height 20.4 m. Find the angle of projection and horizontal range of the projectile.
3. A cricketer can throw a ball to a maximum horizontal distance of 100m. How much high above the ground can he throw the same ball?
4. An aero plane is flying horizontally at a height of 490m with a velocity of 360 km/h. a bag containing ration is to be dripped to the jawans on the ground. How far from them should the bag be released so that it falls directly over them?
5. Two tall building facing each other and are at a distance of 180m from each other. with what velocity must a ball be thrown horizontally from a window 55m above the ground in one building, so that it enters a window 10.9m above the ground in the second building?
6. There are 2 angles of projection for which the horizontal range is same. Prove that the sum of the maximum heights for these two angles does not depend upon the angle of projection.
7. A bullet fired at an angle of 30^0 with the horizontal hits the ground 3km away. By adjusting its angle of projection, can one hope to hit a target 5km away? Assume he muzzle speed to be fixed and neglect air resistance.
8. a) At which point of the projectile motion is i) potential energy ii) kinetic energy iii) mechanical energy maximum?
   b) While firing one has to aim a little above the target and not exactly on the target. Why
9. A cyclist is riding with a speed of 27km/h. As he approaches a circular turn of radius 80m. he applies brakes and reduces his speed at a constant rate of 0.5m/s per second. Find the net acceleration of the cyclist.
10. The length of seconds hand of a clock is 1cm.What is the change in the velocity of the tip in 15 seconds?
11. An insect trapped in a circular groove of radius 12cm moves along the groove steadily and completes 7 revolutions in 100s.
    a) What is the angular and linear speed of the motion?
    b) What is the magnitude of net acceleration?