**Q 02** A boy travelling in an open car moving on a levelled road with constant speed tosses a ball vertically up in the air and catches it back. Sketch the motion of the ball as observed by a boy standing on the footpath. Give an explanation to support your diagram.

Sol. v = vertical velocity of the ball given by the boy

u = velocity of the car which is equal to the horizontal velocity of the ball.

Car open
Position 1

Car open
Position 2
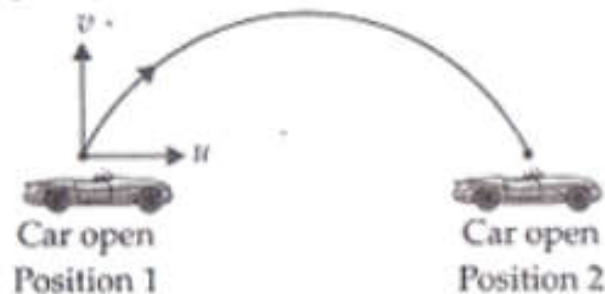
As the ball has both vertical and horizontal components of velocities it's path will be parabolic as observed by a person standing on the footpath.

Path of the ball as seen by the boy sitting in the same car will be only vertically up-down under gravity and will catch up by the boy if car is moving with constant velocity.