1. A small projectile is fired vertically downward into a fluid medium with an initial velocity of 60 m/s. Due to the drag resistance of the fluid experiences a deceleration of \( a = (-0.4v) \text{ m/s}^2 \), where \( v \) is in m/s. Determine the projectile's velocity and position 4 s after it is fired.

2. The position coordinate of a particle which is confined to move along a straight line is given by \( s = 2t^3 - 24t + 6 \), where \( s \) is measured in meters from a convenient origin and \( t \) is in seconds. Determine (a) the time required for the particle to reach a velocity of 72 m/s from its initial condition at \( t=0 \), (b) the acceleration of the particle when \( v=30 \text{ m/s} \), and (c) the net displacement of the particle during the interval from \( t=1 \) s to \( t=4 \) s.

3. During a test a rocket travels upward at 75 m/s, and when it is 40 m from the ground its engine fails. Determine the maximum height \( s_B \) reached by the rocket and its speed just before it hits the ground. While in motion the rocket is subjected to a constant downward acceleration of 9.81 m/s\(^2\) due to gravity. Neglect the effect of air resistance.

4. A particle travels along a straight line with an acceleration of \( a = (10-0.2s) \text{ m/s}^2 \), where \( s \) is measured in meters. Determine the velocity of the particle when \( s = 10 \) m if \( v = 5 \text{ m/s} \) at \( s=0 \).

5. The sport car travels along a straight road such that its position is described by the graph. Construct \( v-t \) and \( a-t \) graphs for the time interval \( 0 \leq t \leq 10 \) s.
6. Determine the speed at which the basket ball at A must be thrown at the angle of 30º so that it makes it to the basket at B.

7. The car is travelling along the road with a speed of \( v = \left( \frac{300}{s} \right) \) m/s where \( s \) is in meters. Determine the magnitude of its acceleration when \( t = 10 \) s, if \( t = 0 \) at \( s = 0 \).

8. Determine the speed of block B in figure if the end of the cord at A is pulled down with a speed of 2 m/s.

9. The ball is ejected horizontally from the tube with a speed of 8 m/s. Find the equation of the path \( y = f(x) \), and then find the ball’s velocity and the normal and tangential components of acceleration when \( t = 0.25 \) s.