1. A baseball is thrown downward from a 50-ft tower with an initial speed of 18 ft/s. Determine the speed at which it hits the ground and the time of travel.

2. When a train is traveling along a straight track at 2 m/s, it begins to accelerate at \( a = 160 v^2 \) m/s\(^2\) where \( v \) is in m/s. Determine its velocity \( v \) and the position 3 s after the acceleration.

3. Traveling with an initial speed of 70 km/h, a car accelerates at along a straight road at 6000 km/h\(^2\). How long will it take to reach a speed of 120 km/h. Also, through what distance does the car travel during this time?

4. A bus starts from rest with a constant acceleration of 1 m/s\(^2\). Determine the time required for it to attain a speed of 25 m/s and the distance traveled.

5. A bicyclist starts from rest and after traveling along a straight path, a distance of 20 m reaches a speed of 30 km/h. Determine his acceleration if it is constant. Also, how long does it take to reach the speed of 30 km/h?

6. A particle moves along a straight line with an acceleration of \( a = (3S^{1/3} + S^{5/2}) \) m/s\(^2\), where \( S \) is in meters. Determine the particle's velocity when \( S = 2 \) m, if it starts from rest when \( S = 1 \) m.

7. Determine the time required for a car to travel 1 km along a road if the car starts from rest, reaches a maximum speed at some intermediate point, and then stops at the end of the road. The car can accelerate at 1.5 m/s\(^2\) and decelerate at 2 m/s\(^2\).

8. A train starts from rest at station A and accelerates at 0.5 m/s\(^2\) for 60s. Afterwards it travels with a constant velocity for 15 min. It then decelerates at 1 m/s\(^2\) until it is brought to rest at station B. Determine the distance between the stations.
(9) The velocity of a car is plotted as shown. Determine the total distance the car moves until it stops. Construct the $a-t$ graph.

(10) The $v-s$ graph for a go-cart traveling on a straight road is shown. Determine the acceleration of the go-cart at $S = 50\ m$ and $S = 150\ m$. Draw the $a-s$ graph.

(11) The $a-t$ graph of the bullet train is shown. If the train starts from rest, determine the elapsed time ($t'$) before it again comes to rest. What is the total distance traveled during this time interval? Construct the $v-t$ and $s-t$ graphs.

(12) A race car starting from rest travels along a straight road and for 10 seconds has the acceleration shown. Construct the $v-t$ graph that describes the motion and find the distance traveled in 10 seconds.

(13) An airplane lands on the straight runway, originally traveling at 110 ft/s when $S=0$. If it is subjected to the decelerations shown, determine the time ($t'$) needed to stop the plane and construct the $s-t$ graph for the motion.