Movement with Uniform Acceleration

1. Symbols that use in the equations of linear motion are as below:

   u = initial velocity

   v = final velocity

   a = acceleration

   s = displacement

   t = time

Equation of linear motion

$$v = u + at$$

$$s = \frac{1}{2}(u + v)t$$

$$s = ut + \frac{1}{2}at^2$$

Example 1

An object accelerates from stationary with the acceleration of 4 ms^{-2}. What is the velocity of the object after 7s?

Example 2

A car is moving with velocity 5ms^{-1} reaches a velocity of 25ms^{-1} in 5s. What is the acceleration of the car?

Example 3

A cyclist riding at a speed of 40ms-1 braked with uniform acceleration and stopped in 40m. How long did he take to stop?

Example 4

A car is accelerated at 4 ms^{-2} from an initial velocity of 5 ms^{-1} for 10 seconds. What is the distance traveled by the car?

Example 5

A car accelerates from 4ms^{-1} reaches a velocity of 28ms^{-1} after traveling for 64m. What is the deceleration of the car?

Example 6

A car begins to move from rest. The velocity of the car increases at a rate of 4ms^{-2}. Find the distance traveled by the car after 12 second.

Example 7

A body is accelerated uniformly from rest and in the first 6.0 s of its motion it travels 30 m. Find

(i) the average speed for this period of 8 s,

(ii) the speed at the end of this period,

(iii) the acceleration.

Challenging Question

1. A car starts from rest and accelerates at a constant acceleration of 3m s^{-2} for 10 seconds. The car then travels at a constant velocity for 5 seconds. The brakes are then applied and the car stops in 5 seconds. What is the total distance traveled by the car?

2. Zulkifli starts driving his car from home with a constant acceleration and reaches a velocity of 30 m/s in 6.0 seconds. Find
   a. the acceleration of Zulkifli's car.
   b. the displacement of Zulkifli's car 5.0 seconds after it started moving.
   c. the displacement of Zulkifli's car at he fifth second..
   d. velocity of Zulkifli's car at time t = 4.0 seconds?
   e. velocity of Zulkifli's car after moving 30.0 meters from the starting point.

Solution: