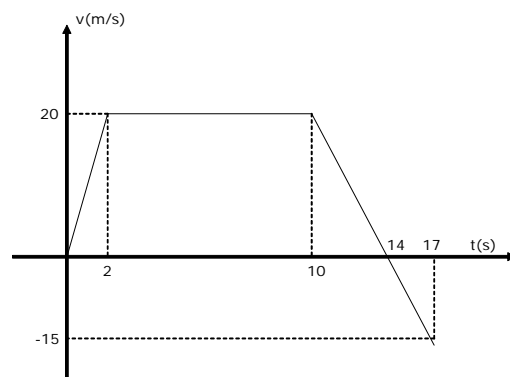


KINEMATICS: EXERCISES

#	Exercise
1	<p>A body moves in straight line (along the X axis) with a constant velocity. When $t=0$ the position of the body is $(8 \text{ m}, 0)$ and 6 s later its position is $(56 \text{ m}, 0)$. Determine:</p> <ol style="list-style-type: none"> The velocity of the body (in m/s and Km/h) The equation of the position vector The position of the body when $t = 10 \text{ s}$ The moment in which its position is $20\text{m } \vec{i}$
2	<p>The initial position of a body is the origin of the reference frame and its initial velocity is $\vec{v}_0 = 24 \vec{i} \text{ (m/s)}$. If the body has a constant acceleration of $\vec{a} = -6 \vec{i} \text{ (m/s}^2\text{)}$, determine:</p> <ol style="list-style-type: none"> the equation of the position vector the moment and position in which the body changes the direction of motion the moment and velocity when the body crosses the origin again draw the v-t graph
3	<p>The initial position of a body is $(3 \text{ m}, 0)$ and has a velocity given by: $\vec{v}=2 \vec{i}+3t \vec{j} \text{ (m/s)}$. Determine</p> <ol style="list-style-type: none"> the equation of the position vector the position and velocity when $t = 3 \text{ s}$ the equation of the trajectory
4	<p>A body moves horizontally according to the graph shown. Its initial position is $(0, 0)$. Determine:</p> <ol style="list-style-type: none"> the type of motion in each interval the acceleration in each interval what happens when $t=14 \text{ s}$ the position of the body at $t=12 \text{ s}$ and $t=17 \text{ s}$



5	<p>The cars "A" and "B" start from the same position at the same time. The "A" car has a constant velocity of 90 Km/h and "B" starts from rest and has a constant acceleration of 4m/s^2.</p> <p>Determine:</p> <ol style="list-style-type: none"> The moment and the position in which one passes the other The velocities at that moment (when one passes the other) The distance between both cars when $t = 10\text{s}$
6	<p>A stone is thrown upwards at an initial velocity of 15 m/s from an initial position of $y_0 = 23\text{ m}$. Determine</p> <ol style="list-style-type: none"> The equation of the position vector The maximum height reached The time it needs to hit the floor The velocity when its position is $y=13\text{ m}$
7	<p>A car has an initial velocity of 108 Km/h, applies the brakes and stops in 90 m. Determine:</p> <ol style="list-style-type: none"> the value of acceleration the equation of the position vector
8	<p>A stone is thrown from a height of 50 m and with an initial velocity of 40 m/s. The angle of the initial velocity with the X axis is 30°. Determine:</p> <ol style="list-style-type: none"> The equation of the position vector The maximum height reached by the stone The horizontal distance when the stone hits the floor The position and velocity (components, magnitude, angle) at $t=3\text{ s}$
9	<p>A projectile is launched at a initial velocity of 200 m/s at an angle of 30° with the X axis. Determine:</p> <ol style="list-style-type: none"> The horizontal distance when it hits the floor The velocity (magnitude, angle) when it hits the floor An obstacle is placed at a distance of 300 m from the launching point. If the height of the obstacle is 80 m, determine whether the projectile will hit that obstacle or not.
10	<p>This is the equation of the position vector for a body: $\vec{r}=(5+t)\vec{i} + (1-t-4t^2)\vec{j}$ (SI) Determine:</p> <ol style="list-style-type: none"> The initial velocity The equation of the trajectory The velocity and acceleration when $t=2\text{s}$
11	<p>A plane is travelling with a speed of 360 Km/h and its height is 5000 m. An object is dropped at that moment. Determine:</p> <ol style="list-style-type: none"> The equation of the position vector for that object The position and velocity when the object hits the floor.