## DESCRIBING THE MOTION OF AN OBJECT.

An object is projected vertically upwards from ground level.
The distance, $\boldsymbol{H}$ from the ground at $\boldsymbol{t}$ seconds is given by :
$H=40 t-5 t^{2}=5 t(8-t)$
Draw the distance-time graph:


Find the velocity equation by differentiation.
$v=\frac{d H}{d t}$
Draw the velocity-time graph:


Find the acceleration equation by differentiation.
$a=\frac{d v}{d t}=$
Draw the velocity-time graph:


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To DESCRIBE the motion of the body at any time $t$, means to find the values of $\boldsymbol{H}, \boldsymbol{v}$ and $\boldsymbol{a}$ with a few words of explanation.
(i) Describe the motion at $t=1 \mathrm{sec}$
(ii) Describe the motion at $\mathrm{t}=6 \mathrm{sec}$

## DESCRIBING THE MOTION OF AN OBJECT. ANSWERS

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Draw the distance-time graph:

Find the velocity equation by differentiation.
$v=\frac{d H}{d t}=40-10 t$
Draw the velocity-time graph:


Find the acceleration equation by differentiation.
$a=\frac{d v}{d t}=-10$
Draw the velocity-time graph:


To DESCRIBE the motion of the body at any time $t$, means to find the values of $\boldsymbol{H}, \boldsymbol{v}$ and $\boldsymbol{a}$ with a few words of explanation.
(i) Describe the motion at $\mathrm{t}=1 \mathrm{sec}$.
$H=40 t-5 t^{2}=35 m$ The object is $35 m$ above the ground
$v=40-10 t=30 \mathrm{~m} / \mathrm{s}$ The object is travelling at $30 \mathrm{~m} / \mathrm{s}$ upwards
$a=-10 \mathrm{~m} / \mathrm{s} / \mathrm{s}$. The object is decelerating at $10 \mathrm{~m} / \mathrm{s}$ every second
(ii) Describe the motion at $\mathrm{t}=6 \mathrm{sec}$.
$H=40 t-5 t^{2}=60 \mathrm{~m}$ The object is 60 m above the ground
$v=40-10 t=-20 \mathrm{~m} / \mathrm{s}$ The object is travelling at $20 \mathrm{~m} / \mathrm{s}$ downwards
$a=-10 \mathrm{~m} / \mathrm{s} / \mathrm{s}$. The object is accelerating down at $10 \mathrm{~m} / \mathrm{s}$ every second (or you could say "decelerating upwards")

