PHYS101
QUIZ#2- CHAPTER 2
DATE: 16/9/12

Name: Key Id#: Sect#:

A car traveling in a straight line at 55 km/h slows down at a constant acceleration of 2.0 m/s^2.
Calculate:
(a) The distance traveled before it stops.
(b) What is the velocity of the car after 3 seconds?
(c) The time it takes to stop.

$$v_0 = 55 \frac{Km}{h} = 55 \text{ Km/h} \left(\frac{1000 \text{ m}}{1 \text{ Km}}\right)\left(\frac{1 \text{ h}}{3600 \text{ s}}\right)$$

$$= 15.3 \text{ m/s}$$

a) $v^2 = v_0^2 + 2a\Delta x$

when it stops $v = 0$

$$\Delta x = -\frac{v_0^2}{2a} = -\frac{(15.3)^2}{2(-2)} = \boxed{58.5 \text{ m}}$$

b) $v = v_0 + at = 15.3 + (-2)(3) = \boxed{9.3 \text{ m/s}}$

c) $v = v_0 + at$

stops $\Rightarrow v = 0$

$$t = -\frac{v_0}{a} = -\frac{(15.3)}{(-2)}$$

$$\boxed{t = 7.7 \text{ s}}$$

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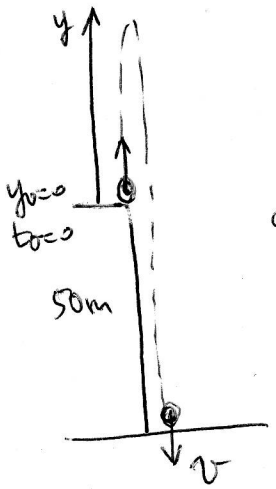
A ball is thrown vertically upward from a building 50 m high with an initial speed of 20 m/s.
(a) What is the maximum height reached by the ball?
(b) What is its position after 5 seconds after throwing it?
(c) What is its velocity just before it hits the ground?



a) $v^2 = v_0^2 - 2g\Delta y$

at max. height $v=0 \Rightarrow 2g\Delta y - v_0^2 = 0$

$\Rightarrow \Delta y = \frac{v_0^2}{2g} =$ **20.4 m**

b) $y - y_0 = v_0 t - \frac{1}{2} g t^2$

$= (20)\times(5) - 4.9\times(5)^2 =$ **$-$ 22.5 m**

below the origin!

c) $v^2 = v_0^2 - 2g\Delta y$

$= (20)^2 - 2\times(9.8)(-50)$

$= 1380\ m^2/s^2$

$v = \pm 37.1\ m/s$

we take $\ominus$ solution because $\vec{v}$ is down!

$v = -37.1\ m/s$

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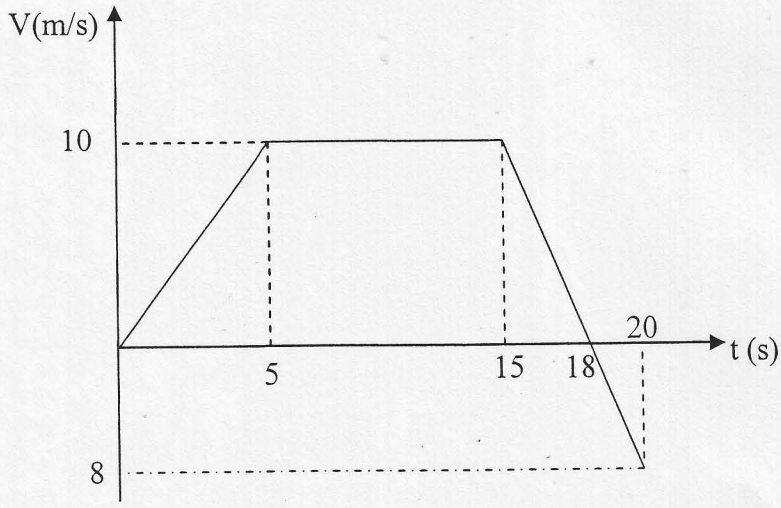
The figure shows the velocity-time graph of a particle moving from the origin in a straight line.
(a) What is the displacement of the particle at it moves from t = 15 to t = 20 s?
(b) What is the acceleration of the particle at t = 2 s?
(c) What is the acceleration of the particle at t = 10 s?
(d) What is the acceleration of the particle at t = 18 s?



a) $\Delta x = \int_{t_1}^{t_2} v\,dt$

= area under the curve v vs. t graph.

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$\Delta x = \frac{1}{2}(10 \times 3) - \frac{1}{2}(8 \times 2)$

$= 15 - 8 = 7$ m

2 b) acc. = slope = $\frac{\Delta v}{\Delta t} = \frac{10}{5} = \boxed{2\ m/s^2}$

2 c) acc. = 0 (slope = 0)

3 d) acc. = slope = $\frac{\Delta v}{\Delta t} = \frac{-8-10}{5} = \frac{-18}{5} = \boxed{-3.6\ m/s^2}$