

# PHYSICS 131

## 3:30 Lecture

KEY

Fall 2005

### QUIZ 1

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4:00 - 4:18  
give 7-15 min

A car accelerates from 0 to 100 km/hr in 5 seconds. Assuming that the acceleration is constant,

(a) What is the acceleration?

$$\textcircled{2} a = \frac{v_f - v_i}{\Delta t} = \frac{30 \frac{m}{s} - 0 \frac{m}{s}}{5s} = \boxed{6 \frac{m}{s^2} = a}$$

$$\textcircled{1} v_f = 100 \frac{km}{h} \cdot \frac{1hr}{60min} \cdot \frac{min}{60s} \cdot \frac{1000m}{1km} = 30 \frac{m}{s} \text{ (don't forget sig figs)}$$



(b) What is the car's speed after 3 seconds

$$v_f = v_i + at = 0 + at = \left(6 \frac{m}{s^2}\right)(3s) = \boxed{20 \frac{m}{s} = v_f}$$

$$\begin{aligned} v_i &= 0 \frac{m}{s} \\ a &= 6 \frac{m}{s^2} \\ t &= 3s \end{aligned}$$

(c) How far does the car go in 5 seconds?

Could use a few different equations.

$$\begin{aligned} v_i &= 0 \frac{m}{s} \\ s_i &= 0m \\ t &= 5s \\ a &= 6 \frac{m}{s^2} \end{aligned}$$

$$\begin{aligned} s_f &= s_i + v_i t + \frac{1}{2} a t^2 \\ &= 0 + 0 + \frac{1}{2} a t^2 = \frac{1}{2} \left(6 \frac{m}{s^2}\right) (5s)^2 = \boxed{80m = s_f} \end{aligned}$$

(if you didn't account for sig figs, you probably got ~70m.)