

# PE 19 KE & PE Version A

①  $\frac{1}{2}mv^2 = U = \text{energy} \rightarrow v^2 = \frac{2U}{m}$

warning: Using E for energy confuses w/ electric field as E

$m_{\text{electron}} = 9.11E-31 \text{ kg}$

$U = 2642 \text{ eV} \frac{1.602E-19 \text{ J}}{1\text{eV}}$

$v^2 = \frac{(2)(2642)(1.602E-19)}{9.11E-31} \rightarrow v = 3.05 \times 10^7 \text{ m/s}$

②  $V = 45.3 \text{ volts} \quad q = 1.602E-19 \text{ C}$

$m_p \approx 1.67E-27 \text{ kg}$

$v^2 = \frac{2qV}{m}$  since  $PE = qV$   
 $\rightarrow v = 9.32E4 \text{ m/s}$

Proton mass depends on where its bound in nucleus.

③  $qV = \frac{1}{2}mv^2 \rightarrow V = \frac{mv^2}{2q}$   $m = 9.11E-31 \text{ kg}$   
 $v = 9.4E6 \text{ m/s}$   
 $q = 1.602E-19 \text{ Coul}$   
 $V = 251 \text{ volts}$

④  $V = \frac{mv^2}{2q}$   $m = 1.67E-27 \text{ kg}$   
 $q = e = 1.60E-19 \text{ Coul}$   
 $v = 8.5E4 \text{ m/s}$   
 $V = 37.7 \text{ volts}$