ADD) EXPLAIN THE eV AS A UNIT OF ENERGY.

THE eV IS DEFINED AS THE KINETIC ENERGY ACQUIRED BY AN e^- CROSSING A POTENTIAL DIFFERENCE OF 1 V.

- THE POTENTIAL DIFFERENCE IS DEFINED AS THE POTENTIAL ENERGY PER CHARGE:

$$V = \frac{U}{q} \Rightarrow U = qV$$

$\Rightarrow$ AN e^- IN A POTENTIAL DIFFERENCE OF 1 V HAS A POTENTIAL ENERGY OF

$$U_{e,1V} = -eV$$

IF THE e^- IS ALLOWED TO CROSS THE POTENTIAL DIFFERENCE, SINCE IT WILL MOVE "UP" THE ELECTRIC FIELD LINES IT WILL ACQUIRE A KINETIC ENERGY EQUAL TO THE NEGATIVE OF IT'S POTENTIAL ENERGY*

$$KE = -U = +eV = \text{ENERGY}$$

SINCE e = CHARGE ON THE ELECTRON AND V = 1 VOLT

$$1eV = (1.602\times10^{-19}\,C)(1V)$$

$$\boxed{1eV = 1.602\times10^{-19}\ \text{JOULES}}$$

* TECHNICALLY, THE WORK DONE ON THE ELECTRON BY THE FIELD IS

$$\text{ENERGY} = \text{WORK} = \text{FORCE} \times \text{DISTANCE}$$

("UP" THE FIELD LINES)

$$= (-eE)(-d) = +eEd = +eV$$

[RECALL V = (ELECTRIC FIELD)(DISTANCE)]