UNITS OF MEASUREMENT

1) v is measured in m/s, and a is measured in m/s^2.

2) F is measured in $N = (kg\ m) / s^2$.

3) and 4) k is measured in J/m^2 or N/m or kg/s^2 which all work out to the same thing.

5) E is measured in N/C which can also be written as $(kg\ m) / (C\ s^2)$.

6) k_e is measured in $(N\ m^2) / C^2$ or $(kg\ m^3) / (C^2\ s^2)$.

7) B is measured in $T = (N\ s) / (C\ m)$ or $kg / (C\ s)$.

8) G is measured in $(N\ m^2) / kg^2$ or $m^3 / (kg\ s^2)$.

9) I is measured in $A = C/s$.

10) V is measured in $V = J/C$.

11) R is measured in $\Omega = V/A$ or $(J\ s) / C^2$.

12) $A \bullet V = (C/s) \bullet (J/C) = J/s$, also known as watts (W), the unit of measurement for power.

13) $(1\ g/cm^3) \bullet (1\ kg / 1000\ g) \bullet (100\ cm / 1\ m)^3 = 1000\ kg/m^3$.

DIMENSIONAL ANALYSIS

14) $\mathrm{N} \neq \mathrm{kg/s}$, so the formula doesn't work... but $F = \frac{m \cdot v^2}{r}$ does work.

15) $\mathrm{m/s} \neq \mathrm{m^2/s^2}$, so the formula doesn't work... but $v = \sqrt{\frac{F}{\left(\frac{\Delta m}{\Delta x}\right)}}$ does work.

16) $\mathrm{m^3/s} \neq 1/(\mathrm{m\ s})$, so the formula doesn't work... but $\frac{\Delta \text{volume}}{\Delta t} = v \cdot \text{area}$ does work.

17) Units matching up does *not* guarantee that the formula is correct!
You can find a hilarious counterexample at http://xkcd.com/687/
However, if the units do *not* match up, that *does* tell you that something's wrong.

SCIENTIFIC NOTATION

18) $(5\times10^{3}\,\mathrm{m})\times(6.2\times10^{4}\,\mathrm{m^2}) = 3.1\times10^{8}\,\mathrm{m^3}$

19) $(3\times10^{4}\,\mathrm{m})^3 = 2.7\times10^{13}\,\mathrm{m^3}$

20) $\frac{(2.4\times10^{2}\,\mathrm{kg})}{(8\times10^{10}\,\mathrm{m^3})} = 3\times10^{-9}\,\mathrm{kg/m^3}$

21) $(4.18\times10^{2}\,\mathrm{kJ}) + (7.9\times10^{4}\,\mathrm{J}) = 4.97\times10^{5}\,\mathrm{J}$ or $4.97\times10^{2}\,\mathrm{kJ}$

22) $F_{\text{Sun on Earth}} = \frac{G \cdot m_{\text{Sun}} \cdot m_{\text{Earth}}}{r^2} = \frac{\left(6.67\times10^{-11}\frac{\mathrm{m^3}}{\mathrm{kg\cdot s^2}}\right)\cdot(1.99\times10^{30}\,\mathrm{kg})\cdot(5.97\times10^{24}\,\mathrm{kg})}{(9.4\times10^{8}\,\mathrm{km})^2}$

$\approx 8.97\times10^{20}\,\mathrm{N}$ (note that km must be converted to m first!)