Scientific Notation

Here are some common physical constants and measurements encountered in physics. Place these numbers into scientific notation and give the number of significant figures in each number as written.

1. the speed of light:
   299792458 m/s
2. The electrostatic force constant (Coulomb's constant):
   8987551788 Nm^2/C^2
3. The mass of an electron:
   0.000000000000000000000000000091093897 kg
4. The mass of the earth:
   598000000000000000000000 kg
5. Planck's constant:
   0.000000000000000000000000000000066260755
6. The universal gravitation constant:
   0.000000000066726 Nm^2/kg^2
7. The mass of the sun:
   1990000000000000000000000000000 kg
8. The electric charge of a proton or electron:
   0.000000000000000000160217733 C
9. Average distance between earth and the sun:
   150000000000 m
10. The number of particles in a mole of a substance:
    602213670000000000000000
11. Frequency of a red laser pointer:
    447000000000000 Hz
12. Average electron to proton distance in a hydrogen atom: 0.0000000000529 m

	Scientific Notation	Sig. Figs.
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These quantities are often involved in calculations according to equations we will be using this year. From the following descriptions, write out the problem using the quantities listed above in scientific notation, and the calculated solution. Use a separate sheet of paper for your answers. Don't worry about the units in this exercise. We will add them later.

1. According to Einstein's famous equation $E = mc^2$ the equivalent energy found in the mass of an electron can be found:
   (energy) = (electron mass) x (speed of light squared)
2. According to Newton's law of universal gravitation, the gravitational force between the earth and the sun can be found:
   (gravitational force) = (universal gravitation constant) x (earth's mass)x(sun's mass)/(average earth to sun distance squared)
3. According to Coulomb's law of electrostatic force, the attractive force between the electron and the proton of a hydrogen atom can be found:
   (electrostatic force) = (electrostatic constant) x (electron charge) x (proton charge)/(distance between electron and proton squared)
4. According to Planck's equation $E = hf$, the photon energy for light of known frequency can be found. Find the photon energy for the red laser light given above:
   (photon energy) = (Planck's constant) x (light frequency)