Homework 1 PHYS 211 Dr. Amir

2. (*a*) 214 $\boxed{\text{3 significant figures}}$

(*b*) 81.60 $\boxed{\text{4 significant figures}}$

(*c*) 7.03 $\boxed{\text{3 significant figures}}$

(*d*) 0.03 $\boxed{\text{1 significant figure}}$

(*e*) 0.0086 $\boxed{\text{2 significant figures}}$

(*f*) 3236 $\boxed{\text{4 significant figures}}$

(*g*) 8700 $\boxed{\text{2 significant figures}}$

3. (*a*) $1.156 = \boxed{1.156 \times 10^{0}}$

(*b*) $21.8 = \boxed{2.18 \times 10^{1}}$

(*c*) $0.0068 = \boxed{6.8 \times 10^{-3}}$

(*d*) $328.65 = \boxed{3.2865 \times 10^{2}}$

(*e*) $0.219 = \boxed{2.19 \times 10^{-1}}$

(*f*) $444 = \boxed{4.44 \times 10^{2}}$

$\boxed{7.}$ To add values with significant figures, adjust all values to be added so that their exponents are all the same.

$(9.3 \times 10^3 s) + (8.3 \times 10^4 s) + (0.008 \times 10^6 s) = 9.2 \times 10^3 s + 83 \times 10^3\ s + 8 \times 10^3 s = 1.0 \times 10^5 s$

When adding, keep the least accurate value, and so keep to the “ones” place in the last set of parentheses.

11. (*a*) 286.6 mm $286.6 \times 10^{-3}\,\text{m}$ $\boxed{0.2866\ \text{m}}$

(*b*) 85 μV $85 \times 10^{-6}\,\text{V}$ $\boxed{0.000085\ \text{V}}$

(*c*) 760 mg $760 \times 10^{-6}\,\text{kg}$ $\boxed{0.00076\ \text{kg}}$ (if last zero is not significant)

(*d*) 60.0 ps $60.0 \times 10^{-12}\,\text{s}$ $\boxed{0.0000000000600\ \text{s}}$

(*e*) 22.5 fm $22.5 \times 10^{-15}\,\text{m}$ $\boxed{0.0000000000000225\ \text{m}}$

(*f*) 2.50 gigavolts $2.5 \times 10^{9}\,\text{volts}$ $\boxed{2{,}500{,}000{,}000\ \text{volts}}$

$\boxed{13.}$ Assuming a height of 5 feet 10 inches, then $5'10'' = (70\ \text{in})(1\ \text{m}/39.37\ \text{in}) = \boxed{1.8\ \text{m}}$. Assuming a weight of 165 lbs, then $(165\ \text{lbs})(0.456\ \text{kg}/1\ \text{lb}) = \boxed{75.2\ \text{kg}}$. Technically, pounds and mass measure two separate properties. To make this conversion, we have to assume that we are at a location where the acceleration due to gravity is 9.80 m/s^2.

$\boxed{19.}$ (*a*) $(1\,\text{km/h})\left(\dfrac{0.621\ \text{mi}}{1\ \text{km}}\right) = 0.621\,\text{mi/h}$, and so the conversion factor is $\boxed{\dfrac{0.621\,\text{mi/h}}{1\,\text{km/h}}}$.

(*b*) $(1\,\text{m/s})\left(\dfrac{3.28\ \text{ft}}{1\ \text{m}}\right) = 3.28\,\text{ft/s}$, and so the conversion factor is $\boxed{\dfrac{3.28\,\text{ft/s}}{1\,\text{m/s}}}$.

(*c*) $(1\,\text{km/h})\left(\dfrac{1000\ \text{m}}{1\ \text{km}}\right)\left(\dfrac{1\ \text{h}}{3600\ \text{s}}\right) = 0.278\,\text{m/s}$, and so the conversion factor is $\boxed{\dfrac{0.278\,\text{m/s}}{1\,\text{km/h}}}$.

23. The surface area of a sphere is found by $A = 4\pi r^2 = 4\pi(d/2)^2 = \pi d^2$.

(*a*) $A_{\text{Moon}} = \pi D_{\text{Moon}}^2 = \pi\left(3.48\times10^6\,\text{m}\right)^2 = \boxed{3.80\times10^{13}\,\text{m}^2}$

(*b*) $\dfrac{A_{\text{Earth}}}{A_{\text{Moon}}} = \dfrac{\pi D_{\text{Earth}}^2}{\pi D_{\text{Moon}}^2} = \left(\dfrac{D_{\text{Earth}}}{D_{\text{Moon}}}\right)^2 = \left(\dfrac{R_{\text{Earth}}}{R_{\text{Moon}}}\right)^2 = \left(\dfrac{6.38\times10^6\,\text{m}}{1.74\times10^6\,\text{m}}\right)^2 = \boxed{13.4}$