## Chapter 1 Problem 28 [†]

**Solution**
Rewrite the following in scientific notation in SI units for mass.

a) 23 mg
m stands for milli, which is $10^{-3}$. Therefore,

$$23\ mg = 23 \times 10^{-3}\ g = 2.3 \times 10^{-2}\ g$$

Since $1\ kg = 1000\ g$, converting this answer to kilograms gives

$$2.3 \times 10^{-2}\ g \left(\frac{1\ kg}{1000\ g}\right) = 2.3 \times 10^{-5}\ kg$$

b) 320 Tg
T stands for tera, which is $10^{12}$. Therefore,

$$320\ Tg = 320 \times 10^{12}\ g = 3.2 \times 10^{14}\ g$$

Since $1\ kg = 1000\ g$, converting this answer to kilograms gives

$$3.2 \times 10^{14}\ g \left(\frac{1\ kg}{1000\ g}\right) = 3.2 \times 10^{11}\ kg$$

c) 42 ng
n stands for nano, which is $10^{-9}$. Therefore,

$$42\ ng = 42 \times 10^{-9}\ g = 4.2 \times 10^{-8}\ g$$

Since $1\ kg = 1000\ g$, converting this answer to kilograms gives

$$4.2 \times 10^{-8}\ g \left(\frac{1\ kg}{1000\ g}\right) = 4.2 \times 10^{-11}\ kg$$

d) 7 g
Since $1\ kg = 1000\ g$, converting this answer to kilograms gives

$$7\ g \left(\frac{1\ kg}{1000\ g}\right) = 7 \times 10^{-3}\ kg$$

e) 9 Pg
P stands for peta, which is $10^{15}$. Therefore,

$$9\ Pg = 9 \times 10^{15}\ g$$

Since $1\ kg = 1000\ g$, converting this answer to kilograms gives

$$9 \times 10^{15}\ g \left(\frac{1\ kg}{1000\ g}\right) = 9 \times 10^{12}\ kg$$

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[†]Problem from University Physics by Ling, Sanny and Moebs (OpenStax)