Quiz*1 Tonight!

(a) Lots o' clickers! Chem review (moles, molar mass, temperature, etc.)
Which of the following molecules is monoatomic at room temperature and 1 atm?

A) Chlorine  
B) Argon  
C) Oxygen  
D) Nitrogen  
E) None of the above

Suppose you have a sample of 2.0 mol of Oxygen gas. What is the mass of this sample?

A) 16 grams  
B) 32 grams  
C) 64 grams  
D) None of the above

\[
2.0 \text{ mol } \text{O}_2 \left( \frac{2 \text{ mol } \text{O}}{1 \text{ mol } \text{O}_2} \right) \left( \frac{16.0 \text{ g}}{1 \text{ mol } \text{O}} \right) = 64 \text{ g}
\]
Which of the following is the best description of the number of moles of copper atoms in a \((10\text{ cm})^3\) cube of copper \((\text{Cu, density } 10 \text{ g/cm}^3)\):

A) \(10^{21}\)  
B) \(10^{22}\)  
C) \(10^{23}\)  
D) \(10^{24}\)  
(E) None of the above is the correct order of magnitude

\[
\text{Volume} = 1000 \text{ cm}^3 
\times \left( \frac{10 \text{ g}}{1 \text{ cm}^3} \right) 
\times \left( \frac{1 \text{ mol Cu}}{63.5 \text{ g Cu}} \right) 
= \frac{6.023 \times 10^{23}}{1 \text{ mol}} 
= 9.5 \times 10^{25} \text{ atoms} 
= 10^{26} 
\]

The following are all state variables. Which of the following is an extensive quantity?

A) Pressure  
B) Mass  
C) Number Density  
D) Temperature

If I double my sample, this quantity **also** doubles, remains the same.
The following figure shows three temperature scales with the freezing and boiling points of water indicated.

What’s biggest, a temperature increase of 10°X, 10°Y, or 10°Z?

A) 10°X  \[\boxed{\text{\textcolor{red}{C}}/10°Z}\] B) 10°Y  \[D) \text{\textcolor{red}{(two are the same)}}\]

\[0°X = \text{“Absolute Zero”} \implies X \text{ is an abs. temp scale.}\]

Which of the following is/are absolute temperature scales?

A) Fahrenheit  \[\text{\textcolor{red}{T: absolute}}\] B) Celsius  \[\text{\textcolor{red}{\Delta T: don't have to.}}\] C) Kelvin

D) (both B and C)
A piston compresses a sample of Nitrogen gas. Describe whether the following quantities increase, decrease, remain the same, or (undetermined):

(A) Moles of gas
(B) Number density
(C) Mass density

(D) Total mass
(E) Pressure
(F) Temperature

Undetermined

(we'll talk about this next week though)

ANS:

(A) remain same
(B) inc.
(C) inc.
(D) remain same

A sample of $^{56}_{26}$Fe (iron-56) has mass $M$ and volume $V$.

A second sample, of $^{120}_{48}$Cd (cadmium-112), has volume $2V$.

What is the mass of this sample of cadmium?

(A) $\frac{1}{4}M$
(B) $\frac{5}{3}M$
(C) $M$

(D) $2M$
(E) $4M$

(D) $2M$