BMC Prelab

1) Masses:
Based on Colloid data sheet

# of colloid	masses [g]	# of atoms in 1 pcl
5623	7.3329×10^{-11}	1.000209
6955	5.330×10^{-10}	0.9999694
5749	5.6643×10^{-13}	0.99976229
6082	4.2476×10^{-12}	0.1004592

$$\frac{\#\text{ of atoms}}{\text{pcl}} = \frac{\#\text{ of microspheres}}{\text{grams}} \left(\frac{\text{mass}}{\text{pcl}}\right) = \frac{\#\text{ of microspheres}}{\text{pcl}}$$

$$\text{mass} = \rho V = \rho \frac{4}{3}\pi r^3 = \rho \frac{4}{3}\pi \left(\frac{d \times 10^{-7}}{2}\right)^3$$

$$\text{mass} = 1.662 \frac{g}{cm^3} \quad \frac{4}{3}\pi \left(\frac{d \times 0.0001\ cm}{2}\right)^3$$

Gold 40 nm	2.988×10^{-12}
Gold 100 nm	3.2359×10^{-12}

Concentration to density conversion.

gold chloride mass = $303.3259 \frac{g}{mol}$

0.01% concentration

$\left(\frac{1}{100}\right) \cdot 100g = 1g$ (assume)

$\frac{1g}{303.325 \frac{g}{mol}} = 0.003296\ mol$