**Quiz 3 Chemical Principles I Chem 1984 Fall 2013**

**Mole Smoke Out \_\_\_\_\_/25**

**Your name: \_\_\_\_\_\_answers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Show work or you receive no credit**

**1 mole count= 6.02\*1023**

1. Compute the molecular weight of Δ-9 THC, C21H30O2 , better known as tetrahydrocannibinol, the active component of marijuana.(Use the Periodic Table data on the back of this quiz.)

**21\*12+30\*1 +2\*16=314**

**C H O**

**Molecular weight of C21H30O2 = \_\_\_\_\_\_\_314\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2 pts**

1. You are holding (for a `friend’ of course) a pure sample of THC that weighs 12.56 grams. How many moles of THC do you have ? **12.56/314=0.04 moles (divide up)\_**

**Moles THC= \_\_\_\_\_0.04\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3 pts**

1. How many molecules of THC are you holding in the above sample ?

**0.04\*6.02\*1023=2.408\*1022**

**Molecules of THC in 12.56 grams=\_\_\_\_\_2.408\*1022\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3 pts**

1. Unfortunately, you are busted for holding the sample above. A DEA analyst uses a mass spectrometer to detect 30 molecules of your THC. What mass of THC is he looking at ?

**(30/6.02\*1023)\*314 g/mol=1.565\*10-20**

**Mass of 30 molecules of THC=\_\_\_\_\_\_\_\_\_=1.565\*10-20\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4 pts**

1. While serving time, you learn to manufacture THC. Once paroled you purchase a 100 gram sample of pure carbon powder and 150 steps later have converted it all to THC. How many grams of THC have you made ? (6 pts)

**100 g/12= mol C =8.333 mol**

**Mol THC/mol C=1/21=x/8.333=> mol THC=x=0.397 mols THC = 0.397\*314 g/mol=124.6 g**

**(about 2500 deep tokes of high grade mj.)**

**Grams of synthesized THC= \_\_\_\_\_\_\_\_\_\_\_\_124.6\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 6 pts**

1. Unfortunately, just as you’ve finished the above synthesis, the `po po’ = police, appear at your doorstep. You must burn your sample ASAP. How many molecules of O2 do you need to destroy the evidence, assuming you convert all your THC back to CO2 **?**

**Moles C already above =8.333**

**Moles O2 in CO2/moles C in CO2 =1/1= x/8.333=> x=8.333 mol O2**

**8.333\*6.02\*1023 molecules of O2 = =5.02\*1024**

**Molecules of O2 to burn your synthesized sample of THC= \_\_\_\_\_\_\_~5\*1024\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7 pts**