**Chem 1013: mini-quiz # 25: Old and New Light Calculations A 2 pts/problem**

**8 pts total**

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

**The speed of light, c=3\*108 m/s. Planck’s constant, h=6.63\*10-34 J\*s**

**1) If a wave has a frequency of 1.5\*108 cycles per second, what is the wavelength, λ in meters (m): f\*λ=3\*108**

**1.5\*108\*λ=3\*108**

**λ=3\*108/1.5\*108 =2 λ= \_\_\_\_\_2\_\_\_\_\_ m**

**2) If a wave has a wavelength of 3\*102 m, what is its frequency f in cycles pers second (1/s)?**

**f\*λ=3\*108**

**f\*3\*102=3\*108**

**f=3\*108/3.0\*102 =1\*106**

**f= \_\_\_106\_\_\_\_\_\_\_\_ cps**

**3) What is the energy of light with a frequency f= 1.508\*1034 ?**

**E=hf=6.63\*10-34f= 6.63\*10-34 \*1.508\*1034=10**

**E= \_\_\_\_\_\_10\_\_\_\_\_\_ J**

**4) What is the energy of light with a wavelength of 9.945 meters (m) ?**

**9.945\*f=3\*108=> f= 3\*108/9.945=3.0166\*107**

**E=6.63\*10-34 \* f= 6.634\*10-34\*3.0166\*107=2\*10-26 J**

**E= \_\_\_2\*10-26\_\_\_\_\_\_\_\_\_ J**

**Chem 1013: mini-quiz # 25: Old and New Light Calculations B 2 pts/problem**

**8 pts total**

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

**The speed of light, c=3\*108 m/s. Planck’s constant, h=6.63\*10-34 J\*s**

**1) If a wave has a frequency of 3\*107 cycles per second, what is the wavelength, λ in meters (m):**

**f\*λ=3\*108**

**3.0\*107\*λ=3\*108**

**λ=3\*108/3.0\*107 =10**

**λ= \_\_\_\_\_10\_\_\_\_\_\_\_\_ m**

**2) If a wave has a wavelength of 150 m, what is its frequency f in cycles pers second (1/s)?**

**f\*λ=3\*108**

**f\*150=3\*108**

**f=3\*108/150 =2\*106**

**f= \_\_\_2\*106\_\_\_\_\_\_\_\_ cps**

**What is the energy of light with a frequency f= 3.016\*1034 ?**

**E=hf=6.63\*10-34f= 6.63\*10-34 \*3.016\*1034=20**

**E= \_\_\_\_\_20\_\_\_\_\_\_\_ J**

**4) What is the energy of light with a wavelength of 19.89 meters (m) ?**

**19.989\*f=3\*108=> f= 3\*108/19.89=1.50829\*107**

**E=6.63\*10-34 \* f= 6.634\*10-34\*1.50829\*107=2\*10-26 J**

**E= \_\_\_1\*10-26\_\_\_\_\_\_\_\_\_ J**