Name: _____ Date_____ Period_____

I. Calculating Frequency & Wavelength of EM radiation

A. Defining variables

a. *Example:*
What is the variable that we use to represent frequency (Hz)? = $\mathcal{F}$ (aka υ)?

b. What is the variable that we use to represent wavelength (m) = **w**

c. What is the variable that we use to represent
Speed of Light (m/s) = **c**
Note: all Electromagnetic Spectrum Waves travel at this same speed

d. Speed of light is a constant. How many m/s does light travel? **$3.00*10^8$**

B. Deriving equations

Given the formula ……C = $\mathcal{F}$*$\mathcal{W}$ (aka $c = \upsilon*\lambda$)

1. What is the formula for calculating $\mathcal{F}$ (aka υ)? $\mathcal{F}$ = **c/w**
2. What is the formula for calculating $\mathcal{W}$ (λ)? $\mathcal{W}$ = **c/f**

C. Calculating Frequency ($\mathcal{F}$) and Wavelength ($\mathcal{W}$)

Show your work! Use a calculator and do the actual math – don't just leave the answer as a fraction!

1. Violet light has a wavelength of 4.10×10^{-12} m. What is the frequency?
f=c/w
$=3.00*10^8/4.10x10^{12}$
$= 0.73\ x10^{20}$
$=7.3*10^{19}$ m

2. Green light has a frequency of 6.01×10^{14} Hz. What is the wavelength?
f=c/w
$=3.00*10^8/6.01x10^{14}$
$=0.499*10^{-6}$ m
$= 4.99*10^{-7}$ m

3. What is the wavelength (in meters) of the electromagnetic carrier wave transmitted by The Sports Fan radio station at a frequency of 640 kHz?*(Hint: convert kHz into Hz by multiplying by 10^3.)*
$f=6.4x10^{(3+2)} = 6.4x10^5$
$w=3.00x10^8/6.4*10^5$
$0.47 \times 10^{(8-5)}$ Hz
$=0.47\ x10^3$ Hz
$= 4.7x10^2$ Hz

4. Calculate the wavelength of radiation with a frequency of 8.0×10^{14} Hz.
w=c/f
$=3.00x10^8/8.0*10^{14}$
$=0.375x10^{(8-14)}$ m
$=0.375x10^{-6}$ m
$=3.75X10^{-7}$ m