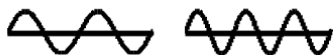


Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## Waves & Particles – Ch. 4

(p. 91 - 94)

1. In the diagrams below, which wave has the higher frequency? Explain.



2. Briefly describe what Planck and Einstein contributed to the concept of Quantum Theory.
3. One of the lines in the emission spectrum of sodium has a wavelength of 590 nm. What is the frequency of this line?
4. A radio station broadcasts at a frequency of 91.3 MHz ( $9.13 \times 10^7$  Hz). What is the wavelength of this EM wave?
5. Calculate the energy of a gamma ray photon with a frequency of  $6.0 \times 10^{22}$  Hz.
6. When an electron in a hydrogen atom drops from the fifth to the second energy level,  $4.58 \times 10^{-19}$  J of energy is released. Find the frequency of the photon that is produced.
7. Order the following regions of the EM spectrum from lowest to highest energy: infrared, microwaves, ultraviolet, visible red, visible green, X-rays.