The Nature of the Electromagnetic Spectrum (Light)

29 Locally, the radio station WWWV broadcasts at 97.5 MHz (97.5×10^{6} Hz). Radio waves are electromagnetic waves like light. The waves travel at the speed of light. What is the wavelength of WWWV's wave length?

30 X-Rays have a wavelength of 1.00×10^{-10} m. What is the x-rays frequency?

31 Microwave ovens have a frequency of 2.457×10^{10} Hz. What is the wavelength of this microwave?

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32 What is the energy of 12 photons from a microwave oven?

33 Visible red light has a wavelength of 0.680 mm. What is the energy of a photon from this light?

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34 A beam of light travels though a piece of plastic at 2.97×10^{8} m/s. What is the index of refraction of this plastic?

35 A beam of light with a frequency of 624×10^{9} Hz travels though a fluid with an index of refraction of 1.44. How fast is the light traveling though the fluid?

36 A beam of light travels though a dense sodium vapor at 260.00 m/s. What is the index of refraction of the sodium vapor?

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37 A beam of light travels though a piece of plastic with an index of refraction of 1.85. What is the wavelength of this light in the plastic if its frequency in a vacuum is 760 nm?

38 A beam of light has a wavelength of 0.950 mm while in a diamond (n=2.48). What is the energy of a single photon in the diamond?

39 A photon travels though a piece of plastic with 6.63×10^{-23} J of energy. What is the wavelength of light if the index of refraction is 1.49?

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40 A beam of light is incident on cubic zirconia. Draw the refracted ray and calculate its refraction angle.