# STRUCTURAL DETERMINATION – PART 1B

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I. Definitions
Wave-particle duality (S3) Quantum (S4) Infrared spectroscopy (S5-7) Ultraviolet spectroscopy (S23-27)
Absorbance and molar absorptivity (S33) β-Carotene (S30) Vitamer (S31) Visual cycle (S31-32)

II. Infrared spectroscopy
A. The result: infrared spectrum (S7)
B. Properties determined in infrared spectroscopy (S5-7)
*How are wavelength and frequency of electromagnetic radiations related to each other? (S3)*
Speed - C = $\lambda \cdot \nu = 3.0 \times 10^{8}$ (m/sec)
*What is the energy of a photon? (S4)*
$\varepsilon = h \cdot \nu$ (Planck constant: $h = 6.6 \times 10^{-34}$ J·s)
*What is wavenumber? (S5)*
$\tilde{\nu} = 1/\lambda = 33 \cdot \nu / 10^{12}$ ($cm^{-1}$)
C. Interpretation of infrared spectra (S7-21)

IV. Ultraviolet spectroscopy
A. The result: ultraviolet spectrum (S23)
B. Properties determined in ultraviolet spectroscopy (S24-29)
C. Interpretation of ultraviolet spectra (S26-29)
*What compounds have a peak in its UV spectrum (200 - 400 nm)?*
D. Quantitative analyses based on ultraviolet spectroscopy (S33)
*What is absorbance?*
$A = \log(I_0/I)$
*What is molar absorptivity?*
$\varepsilon = A/cL$