**Structural determination – Part 1B**

Yeou-Guang Tsay, M.D. Ph.D. E-mail: tsayyeou@nycu.edu.tw Phone: (02) 2826-7119 Line ID: tsayyeou

I. Definitions   
Wave-particle duality (S31) Quantum (S32) Infrared spectroscopy (S33-35) Ultraviolet spectroscopy (S51-55)   
Absorbance and molar absorptivity (S61) β-Carotene (S58) Vitamer (S59) Visual cycle (S59-60)

II. Infrared spectroscopy

A. The result: infrared spectrum (S35)

B. Properties determined in infrared spectroscopy (S33-35)

*How are wavelength and frequency of electromagnetic radiations related to each other? (S31)*

Speed - C = *λ∙ν* = 3.0 × 108 (m/sec)

*What is the energy of a photon? (S32)*

ε = *h*∙*ν* (Planck constant: *h =* 6.6 × 10−34 J⋅s)

*What is wavenumber? (S33)*

*ṽ* = 1/𝜆 = 33∙*ν* /1012 (cm−1)

C. Interpretation of infrared spectra (S35-59)

IV. Ultraviolet spectroscopy

A. The result: ultraviolet spectrum (S51)

B. Properties determined in ultraviolet spectroscopy (S52-57)

C. Interpretation of ultraviolet spectra (S54-57)

*What compounds have a peak in its UV spectrum (200 - 400 nm)?*

D. Quantitative analyses based on ultraviolet spectroscopy (S61)

*What is absorbance?* 𝐴 = log(𝐼0/𝐼)

*What is molar absorptivity?*  
 ε = 𝐴/c𝐿