

Week 2 - Assignment

- Rayleigh scattering occurs by molecules having
 - Dimensions greater than the incident radiation.
 - Dimensions smaller than the incident radiation.**
 - Dimensions similar to the incident radiation.
 - All of these
- A comparison of dispersion by Cornu mounting and Littrow mounting reveals that:
 - The flux in terms of Lumen is greater in Cornu mounting than Littrow mounting.
 - The flux in terms of Lumen is smaller in Cornu mounting than Littrow mounting.
 - The flux in terms of Lumen is same in Cornu mounting and Littrow mounting.**
 - Cannot predict because it depends upon the geometry of the prisms.
- A substance when bombarded with EM radiation shows a broad peak instead of line spectra. This means that:
 - The substance is monoatomic.**
 - The substance is diatomic.
 - The substance is polyatomic.**
 - The transition may not be quantized.
- A quantum of light having the energy E has a wavelength equal to 7200 \AA . The frequency of this light corresponds to:
 - $1.04 \times 10^{-14} \text{ sec}^{-1}$
 - $1.04 \times 10^{+14} \text{ sec}^{-1}$**
 - 2.01×10^{18} photons
 - $1.99 \times 10^{-19} \text{ J}$
- Radiation from a black body emits continuum spectra. This means that the:
 - Transitions occurring are not quantized and hence not distinguishable
 - Transitions occurring are quantized but not distinguishable**
 - Transitions are quantized but can be distinguished by using better optics
 - There are no optic materials that can distinguish them
- The energy of electrons in diatomic molecules are lowest when there is:
 - Electrons are nonbonded
 - Electrons merge with the protons
 - Antibonding among the atoms
 - Bonding among the atoms**
- In acetylene ($\text{CH} \equiv \text{CH}$) there are:
 - σ and σ^* orbitals
 - π and π^* orbitals
 - σ and π orbitals
 - $\sigma, \sigma^*, \pi, \pi^*$ orbitals**
- Trimethyl amine $(\text{CH}_3)_3\text{NH}_2$, is expected to show:
 - $\sigma \rightarrow \sigma^*, \pi \rightarrow \pi^*, n \rightarrow \pi^*$
 - $\pi \rightarrow \pi^*, n \rightarrow \pi^*, n \rightarrow \sigma^*$**
 - $\sigma \rightarrow \sigma^*, \pi \rightarrow \pi^*$
 - $\pi \rightarrow \pi^*, n \rightarrow \pi^*$

e) $\sigma \rightarrow \pi^*$, $\sigma \rightarrow \sigma^*$, $n \rightarrow n^*$

9. In extended molecular transitions, γ and δ substituted carbons contributes

- a) 10 nm
- b) 12 nm
- c) 18 nm
- d) 30 nm

10. Aromatic compounds follow Woodward Fieser rules. Tick whether true or false.