

## Week 3 Assignment

- Hexatriene shows a broad band peak at 256 nm with a  $\epsilon$  value of 22400. This peak is
  - $\sigma \rightarrow \sigma^*$  strong band
  - $n \rightarrow \sigma^*$  strong band
  - $\pi \rightarrow \pi^*$  strong band
  - $\pi \rightarrow \pi^*$  weak band
- Calculate the  $\lambda_{\max}$  for p-chloroacetophenone using Woodward-Fieser rules.
  - 285 nm
  - 256 nm
  - 315 nm
  - 303 nm
- Benzene – iodine shows a  $\lambda_{\max}$  at 300 nm. This is considered to be a charge transfer complex because
  - Benzene and iodine can swap electrons to form C – I complex.
  - The resonance electrons in benzene can transfer electrons to vacant d orbitals in iodine forming an extended double bond structure.
  - The peak at 300 nm is not show either by benzene or iodine singly.
  - Iodine forms CT complexes with many other solvents.
- Beer – Lambert's law is not applicable to all colored solutions at all concentrations. This is because
  - It is only a limiting law applicable only to dilute solutions.
  - It is only a limiting law applicable only to solutions with low refractive index.
  - The linearity is observed only for certain concentration range.
  - The curve could be non linear also.
- Chemical deviations from Beer – Lambert's law are observed only when
  - There is association or dissociation of absorbing coloured species.
  - There is polymerization or depolymerization of absorbing colour species.
  - There is change of pH of the reaction medium.
  - All of these.
- The optimum concentration range for minimum relative error ranges from:
  - 0.2 – 0.8 absorbance
  - Only around 37 % transmittance
  - 0.2 – 1.0 absorbance
  - Only around 37 – 53 % transmittance
- W – I lamps are preferred in visible region as a radiation source because
  - They give bright light in UV – Visible – NIR – IR range.
  - They give uniform light in visible and NIR region
  - They give uniform light in visible, NIR and IR range
  - They are very cost effective
- Echelle gratings are superior compared to other gratings because
  - They have more grooves.
  - They have less grooves.
  - They concentrate the radiation in a small focal distance.
  - Their dispersion value is less.

9. A PMT detector is used in a good quality spectrophotometer because
- a) It amplifies the signal several folds while keeping S/N ratio low.
  - b) It amplifies the signal several folds while keeping S/N ratio constant.
  - c) It amplifies the signal several folds while it uses only  $10^{-14} - 10^{-4}$  current.
  - d) It is very easy to maintain a voltage difference of 75 – 100 V between each dynode.
10. Using a chopper in the path of light beam is advantageous because,
- a) It generates a sine wave which is easy to modulate.
  - b) It generates a cosine wave which is easy to modulate.
  - c) It generates a square wave which is easy to modulate.
  - d) None of these.