



**GIET UNIVERSITY, GUNUPUR – 765022**  
M. Sc. (Second Semester) Examinations, September – 2021  
**20CHPC204 – SPECTROSCOPY-II**  
(Chemistry)

Time: 2 hrs

Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

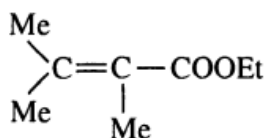
**PART – A**Q.1. Answer **ALL** questions **(2 x 10 = 20 Marks)**

- Explain how the presence of two conjugated chromophores in a molecule shifts both the  $\lambda_{\max}$  and  $\epsilon_{\max}$  to higher values.
- Discussed the  $\lambda_{\max}$  and  $\epsilon_{\max}$  value for cis stilbene and trans stilbene.
- Why does hydrogen bonding lower the absorption frequency?
- What is Fermi Resonance?
- Why is TMS a good reference compound in NMR spectroscopy?
- How will you distinguish between inter and intra-molecular hydrogen bonding on the basis of PMR spectroscopy.
- Write notes on DEPT?
- Write the difference between base peak and molecular ion peaks.
- Define mass spectroscopy.
- What do you understand by Nitrogen rule?

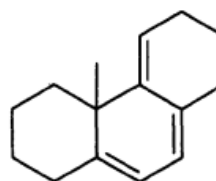
**PART – B (6 x 5 = 30 Marks)**Answer ANY FIVE questions

Marks

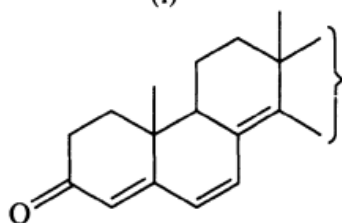
- Explain principle and instrumentation of UV-visible spectroscopy (06)
- Discussed the Woodward-Fisher Rules for Calculating  $\lambda_{\max}$  in  $\alpha, \beta$ -Unsaturated Carbonyl Compounds. Hence Calculate  $\lambda_{\max}$  for the following compounds (06)



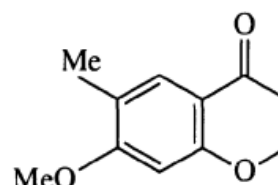
(i)



(ii)



(iii)



(iv)

- Using IR spectroscopy, how will you distinguish: (06)
  - Intermolecular and intramolecular hydrogen bonding
  - cis-cinnamic acid and trans-cinnamic acid

5. A compound with molecular formula  $C_7H_8O$  gives the following IR spectral data. Deduce the structure of the compound. IR bands at 3300 (s), 3040 (m), 2800-2950 (w), 1606 (m), 1582 (m), 1500 (m), 1450 (w), 1380 (w), 1185 (s) 780 (s) and  $692\text{ cm}^{-1}$  (s). (06)
6. An organic compound with molecular mass gave the following spectral data: (06)  
**UV:** No significant absorption band above 200 nm.  
**IR:** Significant absorption bands at 2940, 2270 and  $1460\text{ cm}^{-1}$ .  
**PMR:** 2.72 (septet,  $J = 6.7\text{ cps}$ ) and 1.33 (doublet,  $J = 6.7\text{ cps}$ ) in the intensity ratio 1:6.  
Deduce the structure of the compound.
7. What is chemical shift? Giving examples, discuss the factors which affect the magnitude of the chemical shift. (06)
8. Write notes on McLafferty rearrangement. (06)

--- End of Paper ---