LONG ESSAY (Answer any Three) **3 X 10 = 30 Marks**

1. Explain Woodward-fieser rules to predict the UV absorption for Dienes, homo and hetero annular systems by taking suitable examples.

2. What is 2-D INADEQUATE technique? By the use of this technique how the coupling between ^{13}C-^{13}C established. Explain with suitable example.

3. Identify the structure of an organic compound consistent with the following spectral data:- Molecular formula :- C_8H_9C1,IR Peaks : 3010,2985,1560,1430,701,cm^{-1}
   NMR :- (δ)6.5,1.9,1.3 Mass spectra peaks (m/e) 142,140,105,91,65

4. a) What is Mc –Lafferty rearrangement? Explain with suitable examples (Any two).
   b) What do you understand by metastable peaks? How these are recognized in mass spectrum and what is their importance?

SHORT ESSAY (Answer any Nine) **9 X 5 = 45 Marks**

5. Write the differences between DTA and TGA.
6. Write the applications of DSC in pharmacy.
7. Explain the mass fragmentation patterns and NMR split patterns in following compounds-
   i) Toluene ii) 1- Bromo 2- Chloro-ethane
8. Write the importance of ELISA assay.
9. Explain the principle and applications of supercritical fluid chromatography.
10. How will you identify the following functional group in organic compound by IR:-
    -OH,-NH_2 – COOR, -C=O, -CN.
11. Indicate the point of bond rupture in the molecule lead to each major mass fragment:
    a) 2-methyl-2-butanol which has peaks for appreciable intensity at m/e=73,59,55.
    b) t-butyl acetate with peak at m/e=101,59,57 and 55.
12. Write the applications of GC-MS.
13. Give the important applications of 2-D NMR.
14. Write the principle of Raman spectroscopy.

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