Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 19

M.Sc.(Chemistry) (Campus) (2015 to 2017) (Sem.-1)

ORGANIC SPECTROSCOPY

Subject Code : CHL-404

M.Code : 51143

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying FIVE marks each and students have to attempt ALL questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Which is the main component of mass spectroscopy deal with resolving the ions into their characteristics mass components according to their mass-to-charge ratio?
2. Why the magnitude of coupling constant is higher in the case of benzene rather than cyclohexanes?
3. In which state of matter mass spectroscopy is being performed?
4. What transition is not observed by general UV-Vis spectrophtotmeter?
5. When you use $CDCl_3$ as a solvent in ^{13}C NMR, why are getting extra triplet at ~ 76 ppm?
6. How will you calculate the coupling constant in a given ^{1}H-NMR spectra?
7. What is the essential condition for a molecule to be IR active?
8. Write the possible electronic transitions in the benzaldehyde.
9. Why Aniline shows blue shift in acidic medium?
10. Which bond will vibrates faster between following combinations?
    a) C-H or C-D
    b) C-O or C-Cl

SECTION-B

11. A compound $C_{10}H_{13}Cl$ gave the following NMR data :

    δ 1.57, singlet, 6H; δ 3.07, singlet, 2H; δ 7.27, singlet, 5H. Deduce the structure of compound.

12. Write a short note on McLefferty rearrangement.

13. How would you distinguish ethylamine, diethylamine and triethylamine using Electronionization mass spectrometry (EI-MS) technique?

14. A compound $C_{10}H_{14}$ gave the following NMR data: δ 0.88 (d, 6H); 1.86 (m, 1H); 2.45 (d, 2H); 7.12 (s, 5H). Deduce the structure of compound.

15. Write a short note on the importance of DEPTH technique in 13C NMR spectroscopy.

16. Why the intensity of N-H and O-H absorptions is stronger than C-H absorption?

SECTION-C

17. How do the following factors affect vibrational frequency in infrared spectroscopy?

    a) Hydrogen bonding

    b) Inductive effect and conjugation

18. Explain chemical ionization method uses in mass spectrometry. Why does chemical ionization method give $(M+1)^+$ peak? Describe using chemical equations.

19. Spectral data are given below, determine the structure :

    Molecular formula : C_4H_6O

    IR frequencies in cm^{-1} : 2855, 2740, 1700, 1650

    ^{1}H-NMR: 9.7 (1H, d), 6.7 (1H, dq), 6.9 (1H, dd, J=7 & 17 Hz), 2.5 (3H, d).

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.