

22. An organic compound having molecular formula $C_4H_8O_2$ shows the following spectral data: 1H NMR (δ , $CDCl_3$): 1.2 (t, 3H), 1.97 (s, 3H), 4.1 (q, 2H). Identify the compound.

23. An organic compound having molecular formula $C_7H_{14}O$ shows the following spectral data: 1H NMR (δ , $CDCl_3$): 1.01 (d, 12H), 2.45 (sept, 2H). IR (cm^{-1}): 1710. Find out structure of the compound.

24. An organic compound having molecular formula $C_{10}H_{12}O_2$ shows the following spectral data: 1H NMR (δ , $CDCl_3$): 1.3 (t, 3H), 2.92 (q, 2H), 3.7 (s, 3H), 6.9 (d, $J = 9Hz$, 2H), 7.42 (d, $J = 9Hz$, 2H). IR (cm^{-1}): 1685, 1220. Identify the compound.

25. A compound shows M^+ peak at 142 (100%), and $M+2$ at 144 (131%), $M+4$, at 146 (30%). It shows two signals in the 1H NMR at 3.2, and 2.9 ppm of equal intensity. Identify the compound.

M^+ peak at 142 (100%), $M+2$ at 144 (131%) and $M+4$, at 146 (30%). This combination show that Br and Cl both atom present in a compound.

26. An organic compound shows strong absorption at 1720 cm^{-1} and MS shows peaks at 135 (100%), 136 (6.75%), 137 (33%). The 1H NMR of the compound shows three singlets in the ratio of 2:2:6. Identify the compound.

MS shows peaks at 135 (100%), 136 (6.75%), 137 (33%). Odd mass = N- atom present
Peak at 135 and 137 (1:3), Cl-atom present, 1720 cm^{-1} carbonyl group

Mass = 135 - 35 (Cl) - 14 (N) - 16 (Carbonyl O-atom)

= 70

= $C_5H_{5+5}ClNO$

= $C_5H_{10}ClNO$

Structure of compound =

27. An organic compound having molecular formula $C_{11}H_{16}N_2O$ shows the following spectral data: IR (cm^{-1}): 3442, 3360 and 1690. 1H NMR (δ , $CDCl_3$): 2.51 (t, 2H), 2.80 (s, 3H), 2.85 (t, 2H), 2.9 (s, 3H), 4.0 (brs, 2H), 6.30 (s, 1H), 6.38 (d, $J = 8Hz$, 1H), 6.48 (d, $J = 8Hz$, 1H), 6.96 (t, $J = 8Hz$, 1H); ^{13}C NMR (δ , $CDCl_3$): 31(-), 33(-), 35(+), 38(+), 112(+), 114(+), 117(+), 129(+), 141 (Cquart), 146 (Cquart), 174 (Cquart). MS (m/z): 192(M^+), 162, 175, 148, Identify the compound.

28. An organic compound having molecular formula $C_{11}H_{16}N_2O$ shows the following spectral data: IR (cm^{-1}): 3450, 3430, 1680. 1H NMR (δ , $CDCl_3$): 2.0 (brs, 2H), 2.81 (t, 2H), 2.85 (s, 3H), 2.9 (s, 3H), 2.98 (t, 2H), 7.37 (d, $J = 8Hz$, 1H), 7.42 (t, $J = 8Hz$, 1H), 7.77 (d, $J = 8Hz$, 1H), 7.84 (s, 1H); ^{13}C NMR (δ , $CDCl_3$): 35(+), 36(+), 39(-), 44(-), 124(+), 126(+), 128(+), 129(+), 134

(Cquart), 140 (Cquart), 166 (Cquart). MS (m/z): 192(M+), 162, 175, 148, Identify the compound.

29. An organic compound with MF $C_{10}H_{12}O$ shows following spectral data: 1H NMR (δ , $CDCl_3$): 1.8 (d, 3H), 3.8 (s, 3H), 6.1-6.2 (m, 1H), 6.4 (d, $J = 13Hz$, 1H), 6.8 (d, $J = 8Hz$, 2H), 7.2 (d, $J = 8Hz$, 2H). ^{13}C NMR ($CDCl_3$): 16(+), 56(+), 114(+), 121(+), 126(+), 127.5(Cquart), 128.5(+), 161(Cquart). Propose the structure of the compound.

30. An organic compound with MF $C_{10}H_{12}O$ shows following spectral data: 1H NMR (δ , $CDCl_3$): 1.71 (d, 3H), 3.71 (s, 3H), 6.06 (m, 1H), 6.41 (d, $J = 13Hz$, 1H), 6.65 (dd, $J = 8, 1.5Hz$, 1H), 6.81 (t, $J = 1.5Hz$, 1H), 6.86 (dd, $J = 8, 1.5Hz$, 1H), 7.10 t, $J = 8Hz$, 1H). ^{13}C NMR ($CDCl_3$): 16(+), 56(+), 111(+), 113(+), 118(+), 121(+), 128(+), 129(+), 134(Cquart), 162 (Cquart). Propose the structure of the compound.

31. An organic compound with MF $C_{11}H_{15}NO_2$ shows following spectral data: 1H NMR (δ , $CDCl_3$): 2.27 (s, 6H), 3.52 (s, 2H), 3.71 (s, 2H), 5.0 (brs, 1H, D_2O exchangeable), 6.48 (t, $J = 1.5 Hz$, 1H), 6.54 (dd, $J = 8, 1.5 Hz$, 1H), 6.62 (dd, $J = 8, 1.5 Hz$, 1H), 6.97 (t, $J = 8Hz$, 1H); ^{13}C NMR ($CDCl_3$): 41(+), 44(-), 69(-), 114(+), 116(+), 122(+), 130(+), 135(Cquart), 157(Cquart), 206(Cquart). Propose the structure of the compound.

32. An organic compound with MF $C_{11}H_{15}NO_2$ shows following spectral data: 1H NMR (δ , $CDCl_3$): 2.0 (brs, 1H, D_2O exchangeable), 2.85 (s, 6H), 3.71 (s, 2H), 4.69 (s, 2H), 6.35 (dd, $J = 8, 1.5 Hz$, 1H), 6.40 (dd, $J = 8, 1.5 Hz$, 1H), 6.45 (t, $J = 1.5Hz$, 1H), 6.96 (t, $J = 8Hz$, 1H); ^{13}C NMR ($CDCl_3$): 42(-), 43(+), 72(-), 111(+), 113(+), 118(+), 129(+), 130(+), 135(Cquart), 144(Cquart), 206(Cquart). Propose the structure of the compound.

33. An organic compound C_7H_8 undergoes catalytic hydrogenation to give tetrahydro product C_7H_{12} . The broad band proton-decoupled ^{13}C NMR spectrum of the parent compound shows three signals at 50 (CH), 68 (CH_2), 142 (CH) ppm. Identify the structure of the parent compound.

34. A compound of MF C_7H_7NO gave following spectral data: 1H NMR: 2.76 (dd, 1H, $J = 5.5, 2.5 Hz$), 3.09 (dd, 1H, $J = 5.5, 4.1 Hz$), 3.81 (dd, 1H, $J = 4.1, 2.5 Hz$), 7.42 (t, $J = 8Hz$, 1H), 7.90 (d, $J = 8Hz$, 1H), 8.55 (d, $J = 8Hz$, 1H), 8.70 (s, 1H); ^{13}C NMR: 48.8 (-) 57.3 (+), 123.2 (+), 135 (+), 139 (Cquart), 147(+), 149(+); MS (m/z): 121 (M+). Find out structure of the compound, and assign all the peaks.

35. A compound of MF C_7H_6BrNO gave following spectral data: 1H NMR: 4.23 (d, $J = 5Hz$, 1H), 4.86 (d, $J = 5Hz$, 1H), 7.42 (t, $J = 8Hz$, 1H), 7.90 (d, $J = 8Hz$, 1H), 8.55 (d, $J = 8Hz$, 1H), 8.7 (s, 1H); ^{13}C NMR: 63(+), 68(+), 123(+), 135(+), 139(Cquart) 147(+), 149(+); MS (m/z): 199(M+), 201(+2). Find out structure of the compound, and assign all the peaks.

36. An organic compound shows strong absorption at 1680 cm^{-1} and MS shows peaks at 135 (100%), 136 (6.75%), 137 (33%). The 1H NMR of the compound shows two triplets and two singlets in the ratio of 2:2:3:3. Identify the compound.

37. MS of an unknown organic compound shows M+ peak at 166 (100%), M+2 at 168 (130%) and M+4 peak at 170 (30%). It shows two singlets of equal intensity in the 1H NMR. ^{13}C NMR of this compound shows two quaternary carbons 77 and 78 ppm. Propose suitable structure of the compound.

M+ peak at 166 (100%), M+2 at 168 (130%) and M+4 peak at 170 (30%). This combination show that Br and Cl both atom present in a compound.