QP Code: 501900

(2 Hours)   **[Total Marks :40**

N.B. : (1) Question no **1** is compulsory.
      (2) Attempt any **four** questions from the remaining **six** questions
      (3) **Figures** to the **right** indicate **full** marks
      (4) **Draw** neat **diagrams** wherever **necessary**

1. (a) Explain the following terms (any **two**)   4
      (i)   Fingerprinting region
      (ii)   Base peak
      (iii)   Radio isotopes
      (iv)   Magnetic anisotropy

   (b) Name the following (any **four**)   4
      (i)   Internal standard used in NMR spectroscopy
      (ii)   Name any one type of burner used in flame photometry
      (iii)   One isotope used for therapeutic purpose
      (iv)   Peak with highest intensity in mass
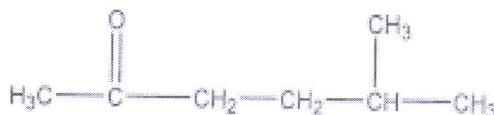   (v)   Carrier gas used in GC-MS

2. (a) List out various ionization techniques used in mass spectroscopy.   4
       Explain any one ionization technique in detail.
   (b) Calculate λ max using Woodward Rule for the following.   4
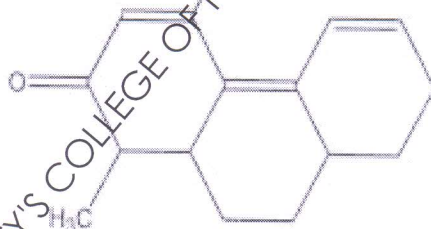
3. (a) Explain anisotropic effect with suitable examples   4
   (b) Depict two fragmentation pathways in mass spectrum of :   4


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4. (a) Discuss various factors influencing chemical Shift values. 4

(b) The molecular formula for unknown compound is $C_3H_6O_2$, molecular weight is 74. 4
It gave the following spectral characteristics:-

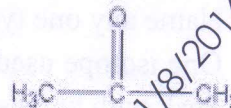IR = 3000-2900 cm^{-1}, 2700 cm^{-1} , 2800 cm^{-1}, 1730 cm^{-1},1380 cm^{-1}

^{1}H-NMR = δ 1.28   t

      δ 4.30   q

      δ 8.30   s

Predict the structure with suitable justification.

5. (a) Discuss instrumentation of atomic absorption spectroscopy. 4

(b) How will you distinguish between following compounds using any one spectral 4
technique.

$H_3C—CH_2—\overset{\displaystyle O}{\overset{\|}{C}}—H$ and $H_3C—\overset{\displaystyle O}{\overset{\|}{C}}—CH_3$
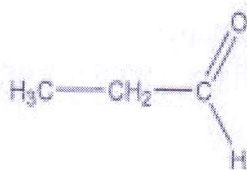
6. (a) Write a note on principle involved in X-Ray diffraction. 4
Discuss its pharmaceutical applications.

(b) The molecular formula for unknown compound is $C_3H_7NO_2$, 4
Its molecular weight is 89.

It gave the following spectral characteristics:-

IR = 3030 cm^{-1}, 2924 cm^{-1}, 1555 cm^{-1}, 1466 cm^{-1}

^{1}H-NMR = δ 1.53   doublet   37.8 squares (J- 6.74 cps)

      4.73   septet   6.2 squares (J- 6.74 cps)

Predict the structure with suitable justification.

7. Write short note on (any two):- 8

(a) Quality control of radio pharmaceuticals

(b) Interfaces used in LC-MS

(c) Mc Lafferty rearrangement

(d) Theory and application of Near IR spectroscopy