B. Voc. (Pharma Analytical & QA) (Sem. V) (CBCS) Examination

May / June - 2018

BVPAQA - 501 : Spectroscopy

Faculty Code : 003
Subject Code : 047501

Time : **3** Hours]   [Total Marks : **70**

1 (a)   Answer the following questions :   **10**

   (1)   Define absorption spectroscopy.

   (2)   Find out DBE for $C_6H_{10}O_3$ and possible number of double bond in it.

   (3)   Give equation of Hooke's law.

   (4)   Which type of solvent is used for UV spectroscopy ?

   (5)   What is the value of nuclear spin for C^{13} atom ?

   (6)   Define ionisation.

   (7)   Define wavenumber.

   (8)   Define σ_h.

   (9)   Give structure of TMS.

   (10) Identify point group of $PtCl_4$.

   (b)   Answer the following questions :   **20**

   (1)   Explain Coupling constant.

   (2)   Give any four reasons that can cause chemical shift change.

   (3)   Define nuclear and vibrational energy with its energy.

   (4)   Give the only the expression for deflection of ion in mass spectrophotometer.

   (5)   Give any four applications of UV spectroscopy.

(6)   Explain any two factors which can affect IR spectra.

(7)   Explain chemical ionization in mass spectroscopy.

(8)   When D is used in point group?

(9)   Explain importance of finger print region in IR spectroscopy.

(10)   Find the point group of $CHCl_3$ and CO_2.

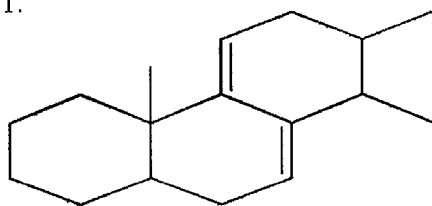2   Answer the following questions : (any **four**)   **20**

(1)   Why TMS is used as a reference in NMR spectroscopy ?

(2)   Explain fundamental modes of vibration in IR spectroscopy.

(3)   Explain the types of transition that take place in UV spectroscopy and give its decreasing order of energy.

(4)   Explain different peak observed in Mass spectra.

(5)   Find out the structure of the molecule from the following data: Molecular formula $C_9H_{12}O$

IR : 3335(b), 2960, 2829, 1615, 1498, 1455, 1057, 1026, 743, 697 cm^{-1} NMR :

(a)   Quintet $\delta = 1.88$ (2H)

(b)   Triplet $\delta = 2.56$ (2H)

(c)   Triplet $\delta = 2.75$ (2H)

(d)   Singlet $\delta = 3.5$ (1H)

(e)   Singlet $\delta = 7.15$ (5H)

(6)   Describe different symmetry elements with an example.

3   Answer the following questions : (any **four**)   **20**

(1) Discuss multiplication table of H_2O and its point group.

(2) Explain in detail Overtone and Fermiresonance.

(3) Explain magnetic anisotropy observed in benzene and acetylene in NMR spectroscopy.

(4) Explain instrumentation of UV spectroscopy.

(5) Explain Mclafferty rearrangement with mechanism taking place in Mass spectra.

(6) Find out the λ max of the following molecules from the UV spectroscopy data :

1.

2.

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