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S. No. of Question Paper : 1856

Unique Paper Code : 217677

E

Name of the Paper : Paper : 24 : Pesticide Formulation and Analytical Techniques

Name of the Course : B.Sc. (Prog.) Applied Life Science

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer five questions out of the following.

All questions carry equal marks.

1. Answer the following :

10×1½

- (a) Define parent ion peak in mass spectroscopy.
- (b) What is the relation between wavelength and frequency ?
- (c) What is excited single state ?
- (d) Discuss reduced mass with proper formula.
- (e) Which is more effective W.P. or E.C. ? Explain.
- (f) Explain, $n-\sigma^*$ transition.

P.T.O.

- (g) Write the structural formula of TMS.
- (h) What is chromophore ?
- (i) When and why the molecules are I.R. active ?
- (j) Give an example of Aerosol.

2. Discuss the following :

5×3

- (a) $n-\pi^*$ transition absorbs lesser energy than $n-\sigma^*$.
- (b) $\pi-\pi^*$ transition in UV spectrum with examples.
- (c) The characteristic transition in CH_3OH and CH_3COCH_3 ?
- (d) Effect of hydrogen bonding in the U.V. absorption.
- (e) Blue shift with examples.

3. Answer the following :

5×3

- (a) How would you explain the $\nu \text{C}=\text{O}$ vibrations in CH_3CHO , with H of aldehyde group is substituted by $-\text{CH}_3$ group ?
- (b) Which vibration appears at higher frequency stretching or bending ? Explain with the help of figs.
- (c) Which of the following absorbs at higher frequency for stretching vibration ? Explain :

O-H and N-H.

- (d) What is the relation between absorbance and transmittance ?
- (e) Arrange the following in decreasing order of energy :

$n-\sigma^*$, $\pi-\pi^*$, $n-\pi^*$, and $\sigma-\sigma^*$

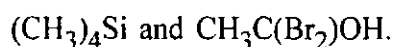
4. Discuss the following :

5×3

(a) Position of methyl protons signals in $\text{CH}_3\text{-O-}$, $\text{CH}_3\text{-I-}$, and $\text{CH}_3\text{-Cl-}$.

(b) The spin-spin coupling in absolute $\text{C}_2\text{H}_5\text{OH}$

(c) The $^1\text{Hnmr}$ signals for the protons in the following compounds :



(d) A compound with molecular formula $\text{C}_3\text{H}_5\text{OCl}$ shows the following $^1\text{Hnmr}$ signals :

(i) Triplet at $\delta = 1.28$ (3H)

(ii) Quartet at $\delta = 3.40$ (2H)

Give the structural formula.

(e) Depict the spin—spin coupling for $\text{CH}_3\text{CH}_2\text{Cl}$ protons.

5. Discuss the following :

5×3

(a) Auxochroms with examples

(b) The shifting in $\nu \text{C}=\text{O}$ vibration in CH_3COCH_3 when hydrogen of alkyl group is substituted by a chloro group.

(c) Micro capsulation

(d) Dehydro chlorination of DDT

(e) Chemical shift.

P.T.O.

6. Answer the following :

5×3

- (a) CO molecule absorbs, while O₂ does not absorb in infrared region; explain.
- (b) How can the IR spectra make distinction between intermolecular and intramolecular hydrogen bonding ?
- (c) Amines show less change in ν N-H vibration on dilution than alcohol for ν O-H vibrations; explain.
- (d) Discuss red shift with examples.
- (e) Discuss the principle of mass spectrometry.

7. Discuss the following :

3×5

- (a) Types of electronic transitions
- (b) Lambert's law
- (c) Role of inductive effect on proton signal positions with example.