

(v) Mono and disubstituted benzene.

MULTIPLE CHOICE QUESTIONS

Choose the correct answer:

1. Vibrational transition exists in
(a) Infra-red (b) microwave (c) radio wave region of the spectrum
2. The total number of normal modes of vibration of a linear molecule consisting of N atoms is given by:
(a) $(3N - 6)$ (b) $(3N - 5)$ (c) $(3N - 7)$
3. For a pure rotational spectrum, the selection rule is
(a) $\Delta J = +1$ (b) $\Delta J = \pm 2$
(c) $\Delta J = 0$, provided the molecule has permanent dipole moment.

4. The IR band spectra show the changes in vibrational and rotational energies of a molecule subject to selection rule:
 (a) $\Delta v = 0, \Delta J = \pm 1$ (b) $\Delta v = \pm 1, \Delta l = \pm 1$
 (c) $\Delta v = \pm 1, \Delta J = \pm 2$
5. For a linear molecule such as HCL, the number of modes of vibration are:
 (a) zero (b) 1 (c) 2 (d) 3
6. For a non-linear molecule like H₂O, the number of vibrational modes are:
 (a) 3 (b) 4 (c) 5 (d) 6
7. For CO₂ molecule, number of modes of vibration are:
 (a) 3 (b) 5 (c) 4 (d) 6
8. The unit of force constant in CGS unit is:
 (a) dyne cm² (b) Joule cm⁻¹ (c) dyne cm⁻¹ (d) None
9. The factor (s) on which the wave number of absorption depends in infra-red spectroscopy is/are:
 (a) Inductive effect (b) Field effect (c) Hydrogen bonding (d) all of these
10. For a same organic compound in all the three states, the absorption frequency has the least value when the compound is in:
 (a) liquid state (b) solid state
 (c) Vapour state (d) same in all the three states
11. In infra-red spectroscopy, the pair of isomers, which cannot be distinguished is / are:
 (a) cis-trans/isomers (b) functional isomers
 (c) enantiomers (d) Position isomers
12. The cycloalkanones, the frequency of absorption for carbonyl group i.e. $\nu_c = 0$ increases with
 (a) increase in size of the ring (b) decrease in size of the ring
 (c) decrease in bond angle. (d) None of these
13. Primary amide (say RCONH₂) shows two absorption bands between 3400-3500 cm⁻¹. On treatment with P₂O₅, the compound formed absorbs at
 (a) 3500 cm⁻¹ (b) 1650 cm⁻¹ (c) 2256 cm⁻¹ (d) 3250 cm⁻¹
14. The absence of absorption bands near 1600, 1580 and 1500 cm⁻¹ is a sure proof for the absence of:
 (a) aromatic ring (b) Carbonyl group
 (c) -OH group (d) Secondary amino group.
15. The type of hydrogen bonding in organic compounds can be distinguished by taking the spectra after dilution with:
 (a) water (b) methyl alcohol
 (c) Carbon tetrachloride (d) acetone.