

K-388

Total Pages : 3

Roll No.

MSCCH-509

Spectroscopy-I

M.Sc. Chemistry (MSCCH)

2nd Semester Examination, 2023 (Dec.)

Time : 2 Hours]

Max. Marks : 70

Note : This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

(2×19=38)

1. What is Raman spectra? Define stoke's and antistoke's line in Raman spectra. Write down the application of Raman Spectroscopy.
2. (a) How will you distinguish 1° , 2° and 3° amines with the help of IR-spectroscopy?
(b) How bond angle and ring strain influence the vibrational frequency? Discuss with example.
3. What is Michelson interferometer discuss the difference between dispersive and FT-IR spectrophotometer.
4. (a) Discuss the rotational spectrum of non-rigid rotator.
(b) Explain the determination of bond length with the help of rotational spectroscopy.
5. Explain Raman scattering with respect to pure vibrational and pure rotational Raman spectra of a diatomic molecule.

SECTION-B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only. (4×8=32)

1. (a) What are P, Q and R branches of the vibration-rotation spectrum?
(b) Discuss zeeman and stark effect.

2. Write short, note on :
 - (a) Bathochromic shift
 - (b) Isobestic point

3. Write short note on :
 - (a) Overtone and combinational band.
 - (b) Hookes law.

4. Discuss the Einstein coefficient.

5. Write and discuss the equation used to calculate the vibrational frequency of a diatomic molecule.

6. Discuss the Beer-Lambert law.

7. Write short note on :
 - (a) Light source in IR-spectroscopy.
 - (b) Classification of IR-bands .

8. Giving reason arrange the carbonyl frequency in the following compounds.


