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2211E067

Candidate's Seat No.:

M.Sc. (Sem.-III) Examination

502

Chemistry (Analytical)

November-2016

[Max. Marks : 70]

Time : 3 Hours]

Q1. Answer the following:

14 marks

(a) Describe the concept of simple harmonic oscillator for the development of wave equation of quantum mechanics.

OR

(a) Explain mechanical model of stretching vibration in a diatomic molecule.

(b) Write a brief note on the various detectors used in IR spectroscopy.

OR

(b) Discuss the instrumentation of FT-IR spectroscopy.

Q2. Answer the following:

14 marks

(a) Discuss Normal Raman spectroscopy in detail.

OR

(a) Explain in brief Raman microprobe and Raman depolarization ratio.

(b) Give the analytical information and applications of Raman Spectroscopy.

OR

(b) Write a note on Remote Raman Analysis.

Q3. Answer the following:

14 marks

(a) Discuss the instrumentation of NMR spectroscopy.

OR

(a) Describe the measurement of absorption in NMR by classical approach.

(b) Write a brief note on the theory of NMR by quantum description.

OR

(b) Explain the physical and chemical principles involved in NMR spectroscopy.

(P.T.O)

Q4. Answer the following:

14 marks

(a) Write a brief note on powder diffraction method.

OR

(a) Discuss about the qualitative and quantitative applications of X-ray diffraction method.

(b) Explain in detail the instrumentation of X-ray diffraction.

OR

(b) Give the principle of single crystal X-ray diffraction and discuss its instrumentation.

Q5. Answer in brief: GujaratStudy.com

1. Give the fullform of the following, PDF and CSD.

2. Give different regions of IR with their range.

3. What is the criterion for the compound to be IR active?

4. What is the relation between frequency, wavelength and wave number?

5. Define spin-lattice relaxation.

6. When do constructive and destructive interferences occur?

7. Give any one limitation of X-ray diffraction.

8. What do you mean by Raman scattering?

9. Give the types of stretching vibrations.

10. What is the unit of coupling constant?

11. What is Resonance Raman Spectroscopy?

12. What do you understand by Karplus relationship?

13. What is the fullform of LIDAR?

14. Give the relation between transmittance and absorbance.