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PPP-2082 Seat No._____

M. Sc. (Sem. II) Examination

April / May – 2016

Chemistry : CHN - 504 (A)

(Spectroscopy)

Time : 2 Hours] [Total Marks : 50

1 Answer any five of the following : 20

(a) Explain P-Q-R branches.

(b) What parameters one can obtain from a study of vibrational rotational spectrum of a hetero-nuclear diatomic molecule ? How are they estimate ?

(c) What is Hooke's law ? How will you calculate the stretching frequency with the help of the above ?

(d) Explain coherent anti-stokes Raman Scattering.

(e) Discuss the Rotational Raman spectra.

(f) Explain : Stark effect.

(g) Explain effect of Isotopic substitution on the transition frequencies.

2 Answer any five of the following : 20

(a) Discuss the factors affecting the chemical shift.

(b) Explain AMX and ABX system.

(c) Give uses of NMR in medical diagnostics.

(d) Write a note on 31_P NMR.

(e) Give an account on 19_F NMR with applications.

(f) Explain coupling constant (J)

(g) Explain the principle of NMR and obtain the resonance condition.

3 Answer any five questions in brief : **10**

(a) What are overtones and hot bonds ?

(b) Give a list of important factors affecting Metal-ligand Vibrations.

(c) What is Rayleigh scattering and Tyndall scattering ?

(d) Give use of Lasers in Raman spectroscopy.

(e) How does microwave spectra differ from intra-red spectra ?

(f) Give application of Raman spectroscopy in polymer chemistry.

(g) What is spin-lattice relaxation ?

(h) What are shift reagents ?

(i) Why a singlet for hydroxyl proton is observed in the NMR spectrum of Acidified ethanol ?

(j) What is Fermi Resonance ?