C.U.SHAH SCIENCE COLLEGE, Ahmedabad.

B. Sc. Semester VI– 2014

PHYSICS PAPER-308

Date: 14 -03-2014

Time: 12:15 to 2:00 **Total Marks:50**

Q1. (a) Explain formation of Electronic Spectra. [6]

OR

(a) Give Differences between Absorption and Emission Electronic Band Spectra. Why study of absorption spectra compared to emission spectra give more information with less elaborate computation? [6]

(b) Expalin how probability density is important in Vibrational Intensity distribution of a Band system. [7]

OR

(b) The zero point energy of ground state of CO is 754 cm^{-1} and 1082 cm^{-1} . the energy difference between minima of the two potential energy curves is 50250 cm^{-1} . What is the energy of the v'=0 to v"=0 transition in cm^{-1} ? What is the corresponding wavelength? [7]

Q.2 (a) Derive the equation $\eta = \frac{1}{3}\rho\langle u_z\rangle\ell$ for coefficient of viscosity of gas. [6]

OR

(a) Derive the equation $k = \frac{1}{3}\eta\langle\upsilon\rangle\ell\, c$ for co-efficient of thermal conductivity of the substance. [6]

(b) Derive Richardson-Dushman equation for thermionic emission. [7]

OR

(b) Explain Molecular collisions. [7]

Q.3 (a) Explain dielectric constant with suitable equations. [6]

OR

(a) Explain theory of electronic polarizability and Optical absorption. [6]

(b) Write Mexwell's equations in matter. What is polarization? [6]

OR

(b) Define dielectric losses. Show that energy losses in the dielectric are proportional to €"(ω). [6]

Q.4 (a) Discusses in detail on Langevin's theory of paramagnetism. [6]

OR

(a) Write a note on Pauli paramagnetism. [6]

(b) Briefly discusses on Nuclear Magnetic Resonance. [6]

OR

(b) Obtain magnetic susceptibility equation for diamagnetism using quantum mechanical formulation. [6]

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QUIZ

(1) **Which principle explains Intensity Distribution in vibration?**

(2) **Which type is the type of I_2 Molecular spetra?**

(3) **Which Parabola show Red-Degraded and Violate Degraded**

(4) **Define Mean free path.**

(5) **Who has explained "Random walk Problem"?**

(6) **Write dimension of scattering cross section σ.**

(7) **Define Effusion.**

(8) **Write two sources that contribute to the total polarizability of dielectric crystal.**

(9) **Write Hund's second rule.**

(10) **Write a definition of Diamagnetism.**

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