Karanjia Auto College ,Karanjia,Mayurbhanj

CC 12, CHEMISTRY HONS.

1. Answer all the questions [1×8=8]

i. What is zero point energy.

ii. Write the condition for normalization of wave function.

iii. Write the wave function for antibonding orbital of H_2 molecule iv. What is electromagnetic radiation.

v. Calculate degeneracy of the energy level having energy $14h^2/8ml^2$ vi.

What is the condition required for a molecule to be microwave active.

vii. Define chemiluminescence. viii. Write the selection rule for vibrational spectra.

2. Answer any **Eight** the questions [1.5×8=12]

i. What are hot bands.

ii. State Frank-Condon principle. iii.

Calculate of degrees of freedom of CO_2. iv.

What is stokes and anti-stokes line. v.

Define P, Q, R branches.

Vi. Give an example of photosensitized reaction. vii.

Give an example of commutation rule. viii.

Write the selection rule of mw spectra.

ix. prblm force constant

x. Write laws of photochemistry.

3. Answer any **Eight** the questions [2×8=16]

i. Define quenching and give an example.

ii. Discuss fluorescence and phosphorescence process.

iii. What is dissociation and predissociation process.

iv. Define actinometry. Give an example of it. v.

Write rule of mutual exclusion.

vi. What is quantum yield. Give an example.

vii. Discuss the reason behind low and high quantum yield. viii. Discuss Morse potential diagram regarding anharmonicity. ix. prblm commutation x. Bond length prblm

4. Answer any **Four** questions [4×6=24]

i. Draw and discuss in brief regarding Jablonski diagram ii. Discuss the methods for determination of quantum yield of a reaction.

iii. Discuss in brief regarding LCAO-MO treatment of H_2^+. iv. Discuss localized and non-localized molecular orbital treatment of H_2O.

V. Derive expression for calculation of energy a particle confined in an one dimensional box having edge length 'l'.

Vi. Derive expression for application of Schrodinger wave equation to a rigid rotor model of diatomic molecule.