Lesson Plan

Session 2021 - 2022

Class - B.S.C 6th Sem

Subject - Atomic, Molecular And Laser Physics

Name - Deepak Kumar

1 Week I	Vector atom model, quantum number associated with vector atom model, Penetrating and non-Penetrating orbits (qualitative descriptions), spectral lines in diff series of alkali spectra, spin orbits interactions and doublet term separations LS or Russel-Saunder coupling jj coupling (expressions for interactions energies for LS and jj coupling required.
2 Week II	Zeeman effect (normal and Anamalous), Zeeman pattern of D_1 and D_2 lines of Na-atom, Paschen Back effect of a single valence electron system weak field Stark effect of hydrogen bond.
3. Week III	Discrete set of electronic energies of molecules quantisations of vibrational and rotational energies. Raman effect (Quantitative descriptions), Stokes and anti-stokes lines.
4. Week IV	Main features of a laser : Directionality, high intensity, high degree of coherence, spatial and temporal coherence, Einstein's coefficient and possibility of amplications, momentum transfer.

5. Week V

Life time of a level kinetics of optical absorptions Threshold Conditions for laser emission, laser pumping He-Ne laser and RUBY laser (Principle, constructions and working). Applications of laser in the field of medicine and industry.

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Class - B.S.C 6th sem

Subject - Nuclear physics

Name - Deepak kumar

1. Week I	Nuclear mass and binding energy, systematics nuclear binding energy, Nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept) Determinations of mass by Brin-Bridge, Bain-Bridge and jordan mass spectrograph, Determinations of charge by mosley law.
2. Week II	Determination of size of nuclei by Rutherford Back scattering Interaction of heavy charged particle (Alpha particles). alpha disintegrations and its theary Energy loss of heavy charged particle (idea of Bethe formula, no derivations) Energetics of alpha-decay, Range and straggling of alpha particle, Greiger-Nuttal law.
3. Week III	Introduction of light charged particles (Beta-particle), origin of continuous beta spectrum (neutrino hypothesis), Types of beta decay and energetics of beta decay, Energy loss of beta-particles (ionizations), Range of electrons, absarptions of beta-particles).

4.	Week IV	Interactions of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passes of Gamma radiations through matter (photoelectric, comption and pair productions effect). electron positions annilations. Absarptions of gamma rays (mass attenuations coefficient) and its applications.
5.	Week V	Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegrations, photonuclear reactions, Radiative capture, Direct reactions, heavy ion reactions and spallations Reactions, conservations laws. Q-value and reactions threshold. Nuclear Reactors, General aspects of Reactor design. Nuclear fissions and fussion reactors (Principles Constructions, working and use.
6.	Week VI	Linear accelerator, Tenden accelerator, cyclotron and Betatron accelerators Ionisations chamber, proportional counter, G.M. Counter detallied study, Scintillations Counter and semiconductor detector.