Lesson Plan

Physics – PH-502

Paper – X : Nuclear Physics

Teacher name: Niyti

October 2020

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| Nuclear composition (p-e and p-n hypotheses), Nuclear properties; Nuclear size, spin, parity, statistics, magnetic dipole moment, quadruple moment (shape concept). Determination of mass by Bain-Bridge, Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosley Law. Determination of size of nuclei by Rutherford Back Scattering. mass and binding energy, systematic of nuclear binding energy, nuclear stability |

November 2020

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| Unit II: Nuclear Radiation decay Processes Alpha-disintegration and its theory. Energetics of alpha-decay, Origin of continuous beta spectrum (neutrino hypothesis), types of beta-decay and energetics of beta-decay. Nature of gamma rays, Energetics of gamma rays. Radiation interaction Interaction of heavy charged particles (Alpha particles); Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Range and straggling of alpha particles. Geiger-Nuttal law. Interaction of light charged particle (Beta-particle), |

December 2020

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| Energy loss of beta-particles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray; Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect) electron-positron annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application. Unit III: Nuclear Accelerators Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators. Nuclear Radiation Detectors. Gas filled counters; |

January2021

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| Ionization chamber, proportional counter, G.M. Counter (detailed study), Scintillation counter and semiconductor detector. Unit IV: Nuclear reactions. Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, Photonuclear reaction, |

February 2021

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| Radiative capture, Direct reaction, Heavy ion reactions and spallation Reactions. Conservation laws, Q-value and reaction threshold. Nuclear Reactors. Nuclear Reactors, General aspects of Reactor Design. Nuclear fission and fusion reactors, (Principle, construction, working and use). |