Internal Assessment Topic 2023-24 Session

Assignment for Semester-II Major Course [PHY-M-T-2: MECHANICS]:
State and explain the two postulates of Einstein's Special Theory of Relativity. Derive the Lorentz transformation equations based on these postulates.

Assignment for Semester-II SEC Course [PHY-SEC-T-2: Basic Instrumentation Skills]: Define and explain the terms accuracy, precision, sensitivity, resolution, and range in the context of measurement instruments. How do these characteristics influence the selection of an instrument for a specific measurement task? Provide examples to illustrate your explanation.

Assignment for Semester-II Minor CoursePHY-MI-T-1: [MATHEMATICAL PHYSICS -I] : Define the divergence and curl of a vector field. Explain the physical significance of these operations with examples.

Assignment for Semester-IV CC Course [PHY-H-CC-T-08**: MATHEMATICAL PHYSICS-III**]:
State and prove Euler's formula. Using Euler's formula, derive and explain De Moivre's theorem. Provide an example to illustrate the application of De Moivre's theorem in finding the roots of a complex number.

Assignment for Semester-IV CC Course [PHY-H-CC-T-09: ELEMENTS OF MODERN PHYSICS]:
Describe the photoelectric effect and Compton scattering as experimental evidence supporting the particle nature of light. Explain how these phenomena are explained by the quantum theory of light.

Assignment for Semester-IV CC Course [PHY-H-CC-T-10: DIGITAL SYSTEMS AND APPLICATIONS]:
Draw and explain the block diagram of a Cathode Ray Oscilloscope (CRO). Describe the main components such as the electron gun, deflection system, and time base generator. Explain the function of each component and how they work together to display waveforms on the screen of the CRO.

Assignment for Semester-IV SEC Course [PHY—H-SEC-T-02: RENEWABLE ENERGY AND ENERGY HARVESTING]: Describe the basic idea and the principle of operation of a non-convective solar pond. Discuss the applications of solar ponds in energy storage and utilization, providing specific examples of their use.

Assignment for Semester-IV Honours General Course [PHY-H-GE-T-04: WAVES AND OPTICS]:
Define a wavefront and describe its properties. Differentiate between different types of wavefronts (e.g., spherical, plane, and cylindrical). Discuss the significance of wavefronts in understanding the propagation of light and provide diagrams to illustrate the different types of wavefronts.

Assignment for Semester-IV Program Course [PHY-G-CC-T-04: WAVES AND OPTICS]:
Define a wavefront and describe its properties. Differentiate between different types of wavefronts (e.g., spherical, plane, and cylindrical). Discuss the significance of wavefronts in understanding the propagation of light and provide diagrams to illustrate the different types of wavefronts.

Assignment for Semester-IV Program SEC Course [PHY-G-SEC-T-02: WEATHER FORECASTING]:
Provide an overview of the Earth's atmosphere, including its physical structure and composition. Discuss the compositional layering of the atmosphere, describing each layer (troposphere, stratosphere, mesosphere, thermosphere, and exosphere) and their characteristics.

Assignment for Semester-VI CC Course [PHY-H-CC-T-13]: ELECTROMAGNETIC THEORY]:
Define vector and scalar potentials in electromagnetism. Explain how these potentials are related to the electric and magnetic fields. Discuss the advantages of using potentials in solving Maxwell's equations, particularly in simplifying boundary value problems and understanding radiation from moving charges.

Assignment for Semester-VI CC Course [PHY-H-CC-T-14]: STATISTICAL MECHANICS]:

Define macrostate and microstate in the context of statistical mechanics. Explain the concept of phase space and how it relates to the counting of microstates. Discuss the Maxwell-Boltzmann distribution law, including its derivation and physical interpretation.

Assignment for Semester-VI DSE Course [PHY-H-DSE-T-03: NANO MATERIALS AND APPLICATIONS]: Discuss the different types of nanostructures, including 1D, 2D, and 3D nanostructures. Provide detailed descriptions and examples of nanodots, thin films, nanowires, and nanorods. Explain how these structures differ in terms of their dimensionality and potential applications.

Assignment for Semester-VI Program Course [PHY-G-DSE-T-02: NUCLEAR AND PARTICLE PHYSICS]:
Explain the concept of binding energy in nuclei. Quantitatively discuss facts about the mass, radii, charge density (matter density), and binding energy of nuclei. Discuss the average binding energy per nucleon and how it varies with the mass number.