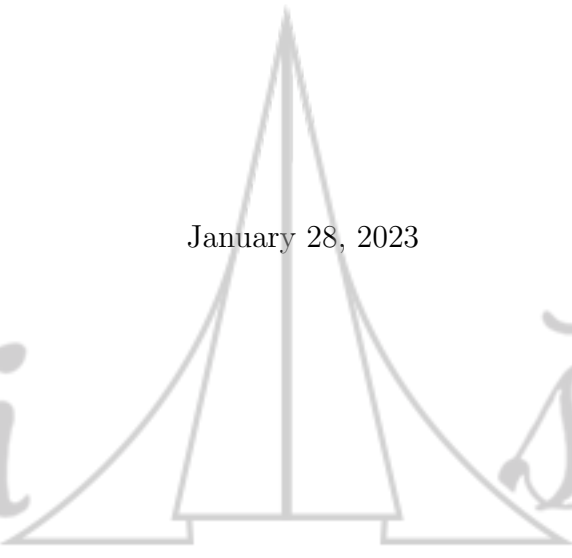


January 28, 2023

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## Index

1. 30-40 % probability: You may skip this section.
2. 60-70 % probability: Not a lot of questions were asked previously, but the topics were indirectly used in other sections. Try not to miss.
3. 80-90 % probability: Important that you thoroughly practice these sections. Most certain questions will be asked.
4. 90-100 % probability: Do you really want to miss the sections marked as 80-90 chance of being asked?!

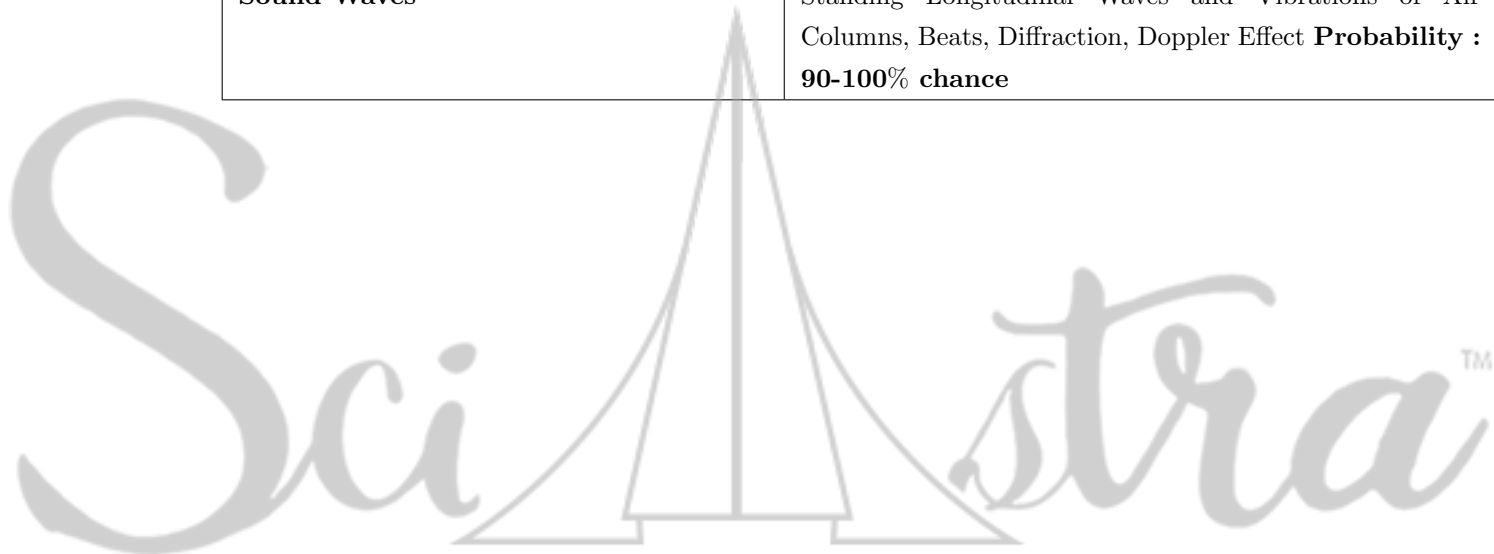


## IAT and NEST (MOST IMPORTANT-Last 2 months prep.)

| <i>Chapters</i>                                      | <i>Most important topics</i>  |
|--|---|
| <b>Units, Measurements and Vectors</b>               | Dimensional analysis, Calculus (used almost everywhere in physics; essential to get a hold of), vector and error analysis. <b>Probability: 80-90% one question</b>  |
| <b>Kinematics</b>                                    | projectile motion, change of frame of reference, Newton's equations of motion. <b>Probability:90% one question</b>  |
| <b>Newton's laws of motion and fictitious forces</b> | Pseudo-forces, Newton's laws of motion. <b>Probability : 60-70% chance of a question</b>  |
| <b>Circular motion</b>                               | Phase diagrams, Effect of Earth's Rotation on Apparent Weight. <b>Probability : 30-40% chance</b>   |
| <b>Work, energy and power</b>                        | Conservative and non-conservative forces (questions can be tricky when it comes to these), frictional forces, focus on learning to plot graphs, Work-energy theorem (of course!), Change in the Potential Energy in a Rigid-body-motion, stability of systems (types of equilibrium). <b>Probability : 90-100% one question</b> |
| <b>Centre of Mass, Linear Momentum, Collision</b>    | Conservation of momentum in general, motion of COM, types of collisions; elastic, inelastic, super-elastic-in 1-D and 2-D, concept of impulse. <b>Probability : 60-70% chance</b>   |
| <b>System of Particles and Rotational Motion</b>     | Conservation of angular momentum, work done by torque, moment of inertia, rolling down an incline plane, pure rolling and action of friction in rolling motion. <b>Probability : 90-100% one question</b>   |
| <b>Gravitation</b>                                   | Gravitational potential, Relation between Gravitational Field and Potential, Kepler's laws, Gravitational Binding Energy and escape velocity. <b>Probability : 70-80% chance of a question</b>  |
| <b>Oscillations</b>                                  | SHM and Phasor diagram, conservation of energy in SHM, simple, compound and torsional pendulum, damping and forced oscillations, condition for resonance. <b>Probability : 70-80 % chance</b>   |

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|---|---|
| <b>Mechanical Properties of Fluids and solids</b> | Pascal's Law, Archimedes' Principle, Equation of Continuity,<br>Surface tension, different modulus, terminal velocity. <b>Probability : 50-60 %chance</b>                           |
| <b>Thermal Properties of Matter</b>               | Can be skipped, but do NOT miss Newton's law of cooling, heat capacity concepts, thermal expansion.   |
| <b>Thermodynamics and KTG</b>                     | PV-diagrams, types of thermodynamic processes, numerical based on laws of thermodynamics, thermal equilibrium, average kinetic energy of a gas. <b>Probability : 90-100% chance</b> |
| <b>Sound Waves</b>                                | Standing Longitudinal Waves and Vibrations of Air Columns, Beats, Diffraction, Doppler Effect <b>Probability : 90-100% chance</b>   |



|  |  |
|--|--|
| <b>Electric Charges and Fields Electrostatic Potential and Capacitance</b> | Electric potential energy, equipotential surfaces, dipoles and their combinations, potential energy function, Gauss's law, various charge distributions and their field intensities, earthing a conductor.<br><b>Probability: 90-100% chance</b> |
| <b>Capacitors</b>  | Energy stored in a capacitor, equivalent capacitance, force between capacitor plates, insertion of dielectric, charging and discharging of capacitors.<br><b>Probability: 80-90 % chance</b>   |
| <b>Current Electricity</b>   | Current density, Faraday's law, temperature dependence of resistance, current through resistor, RC-circuits.<br><b>Probability: 70-80% chance</b>  |
| <b>Moving Charges and Magnetism</b>  | Ampere's law and its applications, Motion of a charged particle in a uniform magnetic field, torque on a current carrying loop, Biot-Savart law, magnetic field of a solenoid and toroid.<br><b>Probability: 90-100% chance</b>                  |
| <b>Magnetism and Matter</b>  | Magnetization or hysteresis curve. Do not miss out the easy sections like magnetic moment, Earth's magnetic field lines, magnetic susceptibility, hysteresis curve.<br><b>Probability: 50-60% chance</b>   |
| <b>Electromagnetic Induction</b>   | Faraday's law, L-C-R circuits, motional emf, self induction, growth and decay of current, energy stored in an inductor, mutual induction.<br><b>Probability: 70-80% chance</b>   |
| <b>Alternating current</b>   | L-C-R and resonance, power in AC circuits, phasor diagram(important).<br><b>Probability: 30-40% chance</b>   |
| <b>Ray Optics and Optical Instruments</b>                                  | Refraction at Plane Surfaces, Refraction at Spherical Surfaces, Snell's law, resolution power, Lens formula.<br><b>Probability: 80-90% chance</b>  |

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*MODERN IS IMPORTANT; DEFINITELY THERE WILL BE QUESTIONS, SO, TRY TO DO IT COMPLETELY!*

|  |   |
|--|---|
| <b>Dual Nature of Radiation and Matter</b> | Photoelectric effect, matter waves, Wien's displacement law. Do LOTS of questions!<br><b>Probability: 80-90% chance</b>   |
| <b>Atoms and Nuclei</b>                    | Radioactivity law and radioactive decay, atomic spectra of hydrogen atom, Bohr's model of H-atom, nature of EM waves, binding energy, Bragg's law, X-Rays, Davisson-Germer experiment, alpha and beta decay. Again, do LOTS of questions!<br><b>Probability: 90-100% chance</b> |
| <b>Semiconductor Electronics</b>           | p-type AND n-type semiconductors, p-n junction, photo-diode and Zener diode, current rectifier, working principle of transistor, Logic gates (important)<br><b>Probability: 80-90% chance</b>   |
| <b>Communication systems</b>               | Small chapter, so try not to miss anything. But not very important. Do it if you get the time!<br><b>Probability: 30-40% chance</b>   |