

NEST 2022 Analysis Report in Physics (Session 1
and 2)

January 3, 2023



Previous analysis v/s NEST 2022

NEST 2022: Session 1

<i>Our prediction</i>	<i>NEST 2022 (Session 1) questions</i>
General Physics	One question was asked. (SCQ), another question was asked on error analysis and statistics (standard deviation). (SCQ)
Units, Measurements and Vectors 1. Atleast one question is expected from the topic of DIMENSIONAL ANALYSIS.	One question based on DIMENSIONAL ANALYSIS was asked. (SCQ)
Kinematics 1. Constant acceleration and projectile motion	Question based on terminal velocity under a drag force. (SCQ)
Newton's laws of motion and fictitious forces 1. Second Law and Momentum its conservation	(Remark: You may expect a question in a future.)
Work, energy and power 1. Conservation of Energy; Work-Energy Theorem, Static and Kinetic Friction	(Remark: atleast one question is expected in future)
System of Particles and Rotational Motion 1. Atleast one question from the topics, angular momentum, centre of mass and torque equation, in short, full chapter is important	Question was asked on rolling motion. (MSQ)
Gravitation	(Remark: atleast one question is expected)
Mechanical Properties of Solids	()
Mechanical Properties of Fluids 1. Viscosity and Surface Tension	Question based on Archimedes's principle of buoyancy and pressure at a height was asked.(SCQ) Another question was asked about fluid in motion(rotating fluid and its properties), radius of curvature of such a fluid. (MSQ)
Thermal Properties of Matter	(Remark: atleast one question is expected)
Thermodynamics and KTG 1. Thermal Expansion, Radiation and Laws of Thermodynamics, KTG and Ideal Gas Law	Direct question on change in pressure inside a vessel. (SQC) Another question was asked on adiabatic process. (MSQ)
Waves and oscillations 1. Wave velocity; Standing Waves; Resonance; Doppler Effects	Question based Doppler effect was asked. (SCQ)

Electric Charges and Fields, Electrostatic Potential and Capacitance 1. Atleast one question from fields and potentials or Gauss's Law	Question was asked on finding the potential at a point in a geometric setup of point charges. (SCQ) <i>Another question was asked on SHM under electrostatic force and its time period. (MSQ)</i>
Current Electricity 1. Solving circuits	<i>(Remark: atleast one question is expected)</i>
Moving Charges and Magnetism	<i>(Remark: atleast one question is expected)</i>
Magnetism and Matter	()
Electromagnetic Induction 1. Inductance	<i>(Remark: atleast one question is expected)</i>
Electromagnetic waves and Wave optics 1. YDSE (Try to cover Polarization too)	Question based on polarization of light and its propagation vector was asked. (SCQ)
Ray Optics and Optical Instruments 1. Entire chapter	<i>(Remark: atleast one question is expected)</i>
Dual Nature of Radiation and Matter 1. Do not miss anything in Modern Physics	Question based on Stefan-Boltzmann law, radiation flux. (SCQ) Another question was asked on Planck's radiation law and angular momentum of an electron in Hydrogen atom. (SCQ)
Atoms and Nuclei 1. DON'T MISS ANYTHING AT ALL, especially radioactivity	Question was asked on radioactive decay and half-life of sample. (SCQ)
Semiconductor Electronics	Question asked on p-n junction and doping. (MSQ)
Communication systems	()

NEST 2022: Session 2

<i>Our prediction</i>	<i>NEST 2022 (Session 2) questions</i>
General Physics	
Units, Measurements and Vectors <ol style="list-style-type: none"> Atleast one question is expected from the topic of DIMENSIONAL ANALYSIS. 	Question asked on dimensional analysis. (SCQ)
Kinematics <ol style="list-style-type: none"> Constant acceleration and projectile motion 	Question based on projectile motion. (SCQ) Question asked based on motion of dropped objects under gravity, distance travelled by objects in $n - th$ second.(MSQ)
Newton's laws of motion and fictitious forces <ol style="list-style-type: none"> Second Law and Momentum its conservation 	Action of force on a body and its consequence; general application of Newton's Second Law. (SCQ) Graph question based on action of Normal force. (SCQ)
Work, energy and power <ol style="list-style-type: none"> Conservation of Energy; Work-Energy Theorem, Static and Kinetic Friction 	Question asked about terminal velocity of coalescing drops. It involved use of multiple concepts. (SCQ)
System of Particles and Rotational Motion <ol style="list-style-type: none"> Atleast one question from the topics, angular momentum, centre of mass and torque equation, in short, full chapter is important 	Question asked involving multiple concepts from rotation about a fixed axis, gas in a cylinder and the variation of pressure under motion at a given temperature.(SCQ)
Gravitation	Similar question from one of the research paper/reference books was about the variation of gravitational field in a dense atmosphere. Concepts of Ideal gas was used as well. (MSQ)
Mechanical Properties of Solids	Question asked on Young's modulus of elasticity, elongation in wire under tension, temperature dependence of elongation in a wire. (MSQ)
Mechanical Properties of Fluids <ol style="list-style-type: none"> Viscosity and Surface Tension 	Question asked based on pressure inside a bubble and surface tension. (SCQ)
Thermal Properties of Matter	Question based on Newton's law of cooling was asked. (SCQ)
Thermodynamics and KTG ⁴ <ol style="list-style-type: none"> Thermal Expansion, Radiation and Laws of Thermodynamics, KTG and Ideal Gas Law 	()
Waves and oscillations <ol style="list-style-type: none"> Wave velocity; Standing Waves; Resonance; Doppler Effects 	()

Electric Charges and Fields, Electrostatic Potential and Capacitance 1. Atleast one question from fields and potentials or Gauss's Law	Question based on the use of Coulomb's law. (SCQ) Another question was asked about motion of charged particles in a uniform electric field. (MSQ) Yet, another question was asked about field at a distance from a charged conductor, application of Gauss's law, variation of surface charge density. (MSQ)
Current Electricity 1. Solving circuits	Question based on $R - C$ circuit was asked; charge stored in a capacitor. (SCQ)
Moving Charges and Magnetism	<i>(Remark: atleast one question is expected)</i>
Magnetism and Matter	()
Electromagnetic Induction 1. Inductance	<i>(Remark: atleast one question is expected)</i>
Electromagnetic waves and Wave optics 1. YDSE (Try to cover Polarization too)	()
Ray Optics and Optical Instruments 1. Entire chapter	Question asked based on Snell's law and ray tracing in a prism. (SCQ)
Dual Nature of Radiation and Matter 1. Do not miss anything in Modern Physics	()
Atoms and Nuclei 1. DON'T MISS ANYTHING AT ALL, especially radioactivity	Question based on radioactive decay and half-life was asked. (SCQ)
Semiconductor Electronics	()
Communication systems	()

Conclusion:

The majority of questions were posed based on an examination of previous year question papers.

A critical advice is that since certain questions from a single chapter only, just based on a deeper understanding of concepts, it is better that you thoroughly understand a concept and learn its applicability. Do not miss certain easier chapters, as some questions are asked in another session if not in one. This can leave you at a disadvantage if you leave them out.

The questions from certain chapters that had a high probability of coming but did not, might as well be asked in the coming years. One should not shift their focus from major chapters like:

1. Magnetism (mostly formula based questions are asked but ensure the practice)
2. Wave optics (the chapter is small, but the variety of questions is huge. The questions asked may not be numerical, but conceptual and/or analytical)
3. Modern Physics (the whole Modern Physics is a bridge between scoring good and better than good as most questions are conceptual and/or numerical, so you may be required to memorize certain formula and constants).

The questions asked vary from numerical to conceptual to graph based. The sections that are most important are as follows:

- (a) DON'T miss anything, especially Snell's law, resolution power, intensity of radiation, de-Broglie waves, Wien's displacement law, radioactivity law and radioactive decay, atomic spectra of hydrogen atom, Bohr's model of H-atom, nature of EM waves.
4. Semiconductor Physics (a single question is probable to come based on truth table or semiconductor devices and/or logic gates)
5. Magnetism in matter (there may be a question on magnetization or hysteresis curve. Do not miss out the easy sections).
6. Newton's laws of motion (keep the concepts strong. The questions asked are mostly standard, but not asked quite often.)
7. Work, energy and power (there may be a question on work done by non-uniform forces, or based on work-energy theorem. Practice a few questions based on graph (this may involve more than one concepts, like work-energy theorem applied to rotational mechanics). The types of questions formed are numerous, so make sure to practice "unique" types of questions only).

8. Gravitation (A question may come on Kepler's laws or conservation laws, gravitational potential. Mostly, a question involving multiple concepts might come, so make sure to practice "unique" types of questions only)
9. Waves and oscillations (practice unique questions and systems involving block(s) and a spring, waves on a string, simple harmonic motion of pendulums).
10. Thermal properties of matter (practice questions on thermal expansion, Newton's law of cooling, etc.)
11. Thermodynamics and KTG (practice "unique" questions on PV-diagrams, types of thermodynamic processes, numerical based on laws of thermodynamics, thermal equilibrium, average kinetic energy of a gas).
12. Kinematics (practice "unique" questions based on angular momentum of a projectile, questions based on graph).
13. Current electricity and Alternating current (Revise concepts like current in the circuit, temperature dependence of resistance, current through resistor. Try solving "unique" problems, RC-circuits, charging and discharging of capacitors.)
14. Fluid mechanics (not a lot of questions have been asked lately, but there is a possibility of questions being asked from certain mixed topics like fluid in a tube and Archimedes's principle. Try not to skip all sections. Practice "unique" questions.)

Remember, in all of physics, it is the concept that matters. You can memorize all you want, but it is the understanding of the Physics that will take you to the solution. This is achievable only by rigorous practice of "unique" problems in Physics and thorough introspection of the concept.